THE IRON AGE

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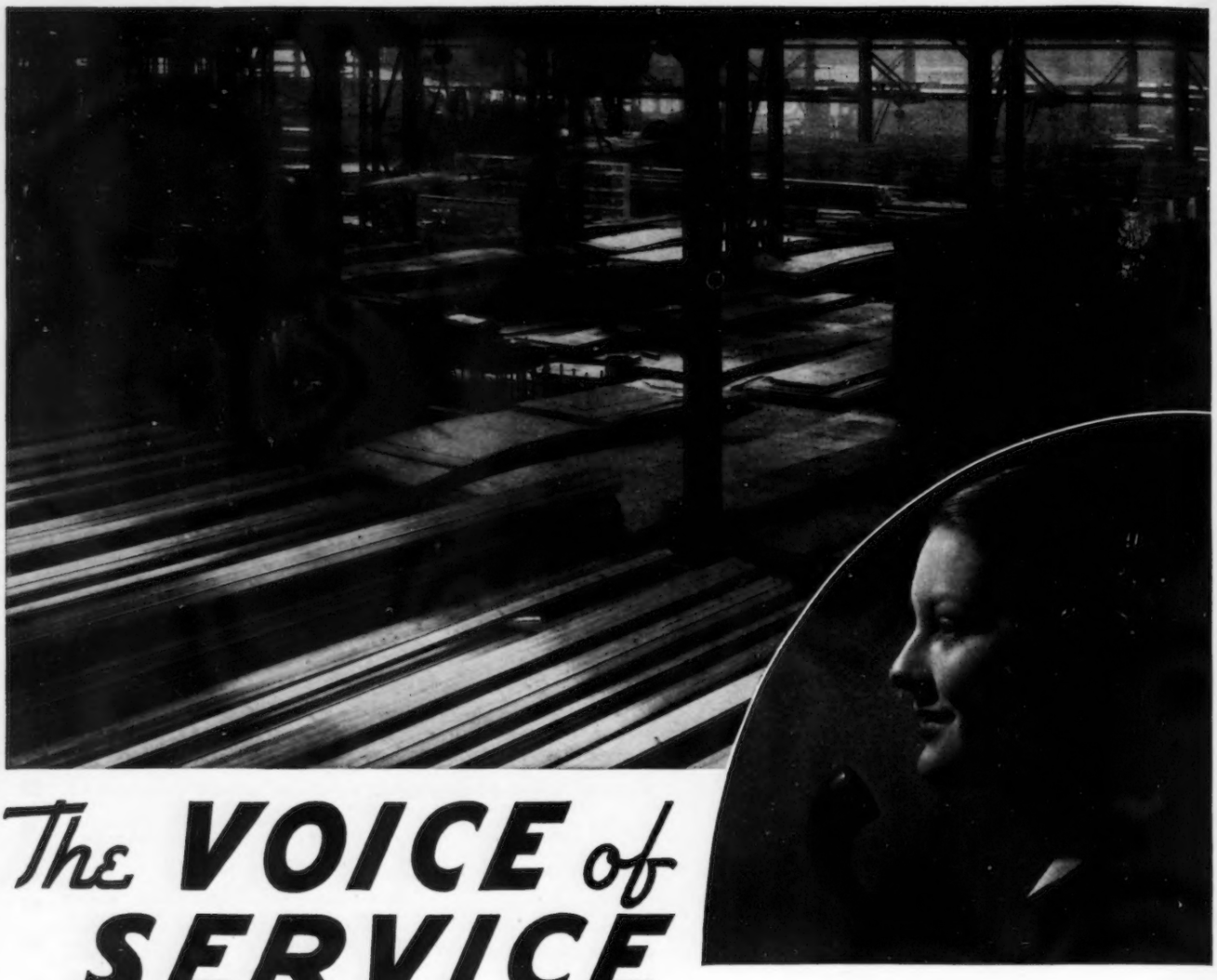

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...THE IRON AGE...

JANUARY 21, 1937

ESTABLISHED 1855 Vol. 139, No. 3

Achilles' Heel

ONE of the difficulties of modern life, and especially of industrial life, is our growing vulnerability. Millions of people in cities are dependent upon underground pipes and a few pumping stations for water; upon central stations for light and power; upon relatively few telephone exchanges for communication. Let anything happen to disable these critical services and millions are made to suffer.

The vulnerability of populations in such matters is clearly recognized in times of war. We realize that a single man with a high explosive bomb could easily cripple one of these vital services. And we guard against such contingencies.

In industrial life, which is our major source of employment, vulnerability is even more widespread. In a modern mass production plant, not only does the flow of production depend upon receipts of material from many suppliers, but one department depends upon another. Even in a single department, a few key machines may determine the continuity of work of several hundred other machines and of as many men.

This is why a comparatively small number of "sit-down" strikers, as in the General Motors case, are able to issue the command: "Thou shalt not work" to many times their number. That is the course through which John Lewis, realizing his inability to conquer new fields through legitimate majorities, plans to bring our great industries into his labor empire through coercion by minorities.

His present course is not a case of legitimate unionism, which earns its right to exist through the peaceful persuasion of a majority of workers in a shop or in a trade, and which maintains this right through the observance of its contracts.

There is as much difference between legitimate unionism and the Lewis kind as there is between the legitimate merchant who does business within the law and the racketeer who operates in defiance of law.

In this connection, it is well for us to read the words of the noted liberal and friend of labor, Louis D. Brandeis:

> **"Lawless or arbitrary claims of organized labor should be resisted at whatever cost. . . . The history of Anglo-Saxon and of American liberty rests upon that struggle to resist wrong—to resist it at any cost when first offered rather than to pay the penalty of ignominious surrender. . . .**
>
> **"Industrial liberty, like civil liberty, must rest upon the solid foundation of law. . . . If lawless methods are pursued by trades unions, whether it be by violence, by intimidation or by the more peaceful infringement of legal rights, that lawlessness must be put down at once and at any cost."**

But Mr. Lewis, we must admit, is doing one good thing for his country. His present activities are rapidly hastening the day when the vulnerable public will demand protection from over-ambitious labor royalists through the incorporation of trade unions.

DURABLE GOODS SHARING FULLY *in* RECOVERY

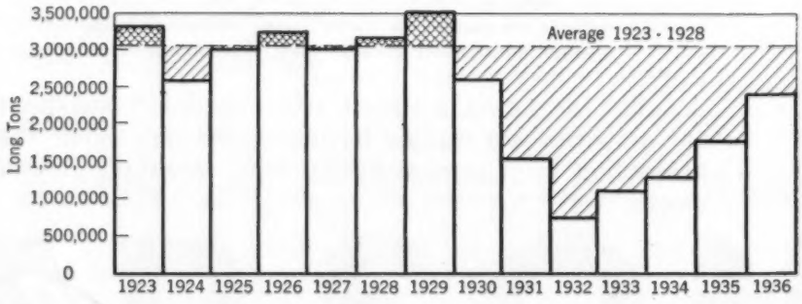
By J. FREDERIC DEWHURST

CONVINCING evidence is now available that the durable goods industries as a whole are at last getting a reasonable share in the business recovery which has been under way in the United States for nearly four years. All of the recognized indexes of general business activity, prices, employment and production show unmistakably that, disregarding erratic monthly fluctuations, the year 1932 marked the low point in the most severe and prolonged depression of modern times. This was true both for general business and for the capital goods industries.

Each year since 1932 has witnessed a distinct gain in business volume over the preceding year, until after four years of recovery the levels of 1930 have again been reached or exceeded. Most of the durable goods industries have shared in these year-to-year gains since 1932, but the expansion in these industries has been much less rapid over the period as a whole, than in consumption goods. Only in 1935 and 1936 have the heavy industries made rapid strides in regaining the ground lost during the depression.

Capital Goods Prospects Best In Decade

This rapid acceleration during the past year, coupled with the fact that accumulated shortages of capital goods have still further increased, makes the outlook for 1937 more promising than at any time in the past decade. In spite of uncertainties that still exist—in fact *because* of some of these uncertainties which may affect the future course of prices—it may safely be predicted that 1937 will be a better year than 1936 for most branches of the durable goods in-



PIG IRON PRODUCTION (Monthly Averages). Pig iron production comprises practically the entire United States output, except that made with charcoal. Compiled by THE IRON AGE.

dustries. Volume assuredly will be greater and prices in many lines give evidence of further strengthening. With larger volume and higher prices, profits might be expected to increase even more sharply. But the outlook here is clouded somewhat by the possibility of labor difficulties and higher labor costs. Any attempt to appraise the outlook for the capital goods industries over the next several years, of course, could not be made without taking into account the probable effects of the undistributed profits tax on plant expansion programs. It seems doubtful, however, whether this tax can seriously alter the favorable outlook for this year.

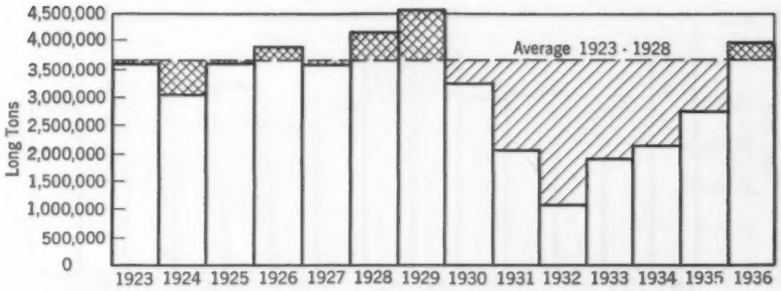
Extensive Recovery in Durable Goods

The extent of recovery in durable goods during the past four years can be seen in the accompanying charts which show the trend of operations in a number of representative heavy industries during the seven lean years of depression as compared with the period of prosperity preceding the industrial collapse in 1929. In each chart the height of the vertical bars, measured against the scale on the left, shows the average monthly rate of operations for the year. For the year 1936, averages for 11 months are used in most cases, since data for the full year are not available at the time of going to press.

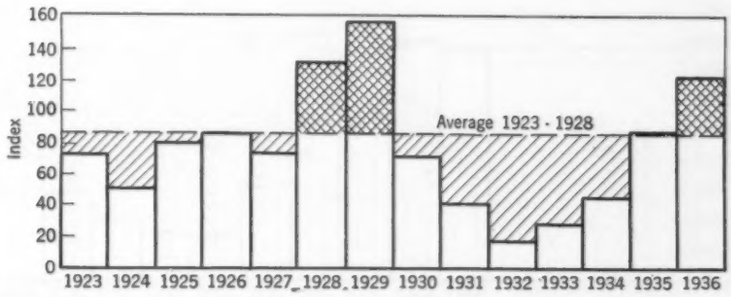
In order to provide a basis against which to compare current operations, the horizontal dotted line on each chart shows the average monthly rate of operations in each industry for the relatively stable and normal period preceding, but not including the boom year 1929.

Factor of Population Growth

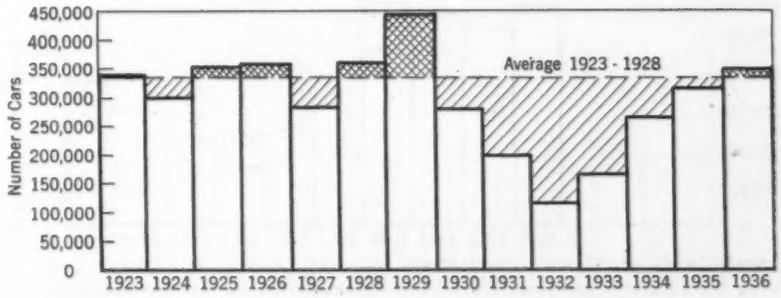
Since this average measures operating rates in these industries under normally prosperous conditions in the past, it can be taken as indicating the normal level of need for the near term future. In fact, the average of pre-depression years undoubtedly understates reasonable future expectancy for some of the heavy industries, since population growth itself is still a powerful factor responsible for steady expansion of demand for capital



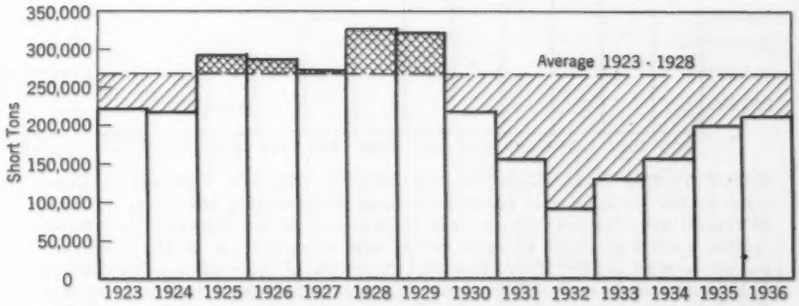
STEEL INGOT PRODUCTION (Monthly Averages). Based on reports from companies representing more than 95 per cent of the total production, computations to 100 per cent being made by the American Iron and Steel Institute. Published currently by United States Department of Commerce in the Survey of Current Business.



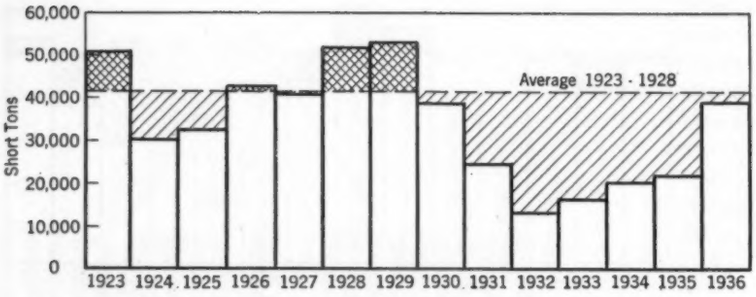
MACHINE TOOLS AND FORGING MACHINERY—ORDERS (Monthly Averages of Index Numbers: Average Monthly Shipments, 1926 = 100). Represents bulk of production in industry. Compiled by the National Machine Tool Builders' Association. Published currently by United States Department of Commerce in the Survey of Current Business.



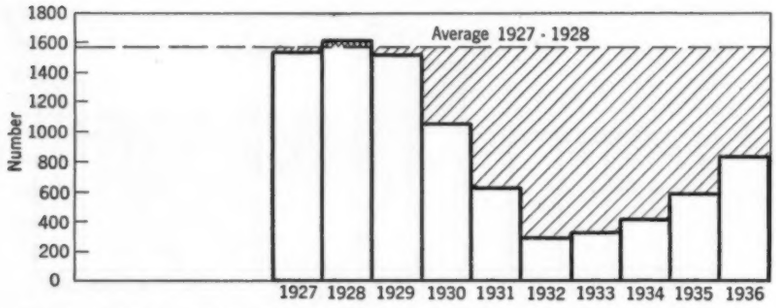
AUTOMOBILE PRODUCTION (Monthly Averages). Includes passenger cars, taxicabs, and trucks. Represents practically complete production or factory sales (including foreign assemblies from parts made in the United States and reported as complete units or vehicles) as compiled by the United States Bureau of the Census, in cooperation with the National Automobile Chamber of Commerce. Published currently by United States Department of Commerce in the Survey of Current Business.



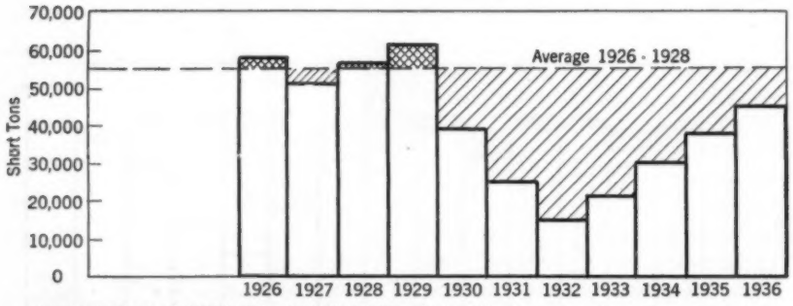
STEEL SHEETS—PRODUCTION (Monthly Averages). Compiled by the National Association of Flat Rolled Steel Manufacturers, representing almost all the independent sheet makers. Published currently by United States Department of Commerce in the Survey of Current Business.



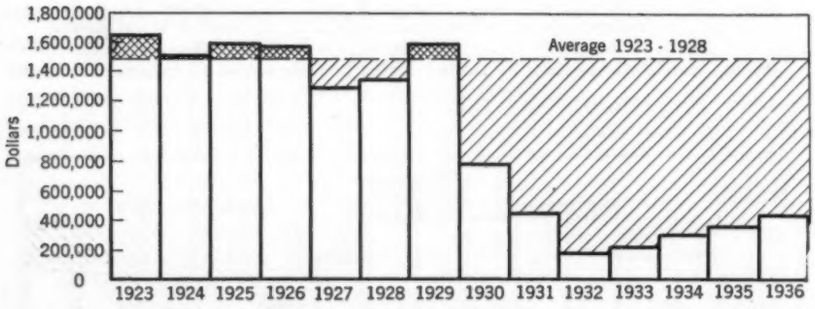
FABRICATED STEEL PLATE—NEW ORDERS (Monthly Averages). Includes oil storage tanks, refinery, tank cars, gas holders, blast furnaces, etc. Figures compiled by the United States Bureau of the Census from reports of members of the American Erectors' Association and other large fabricators. Published currently by United States Department of Commerce in the Survey of Current Business.



STEEL BOILERS—NEW ORDERS (Monthly Averages). Compiled by the United States Bureau of the Census from reports of 65 to 70 firms, about 90 per cent of the industry. Published currently by United States Department of Commerce in the Survey of Current Business.



MALLEABLE CASTINGS—SHIPMENTS (Monthly Averages). Compiled by the United States Bureau of the Census, represents reports from establishments covering about 88 per cent of the industry. Published currently by United States Department of Commerce in the Survey of Current Business.



WOODWORKING MACHINERY—SHIPMENTS (Monthly Averages). Compiled by the Association of Manufacturers of Woodworking Machinery on basis of reports covering over 40 per cent of shipments in the industry. Reports of members average about 25 each month, and vary from 18 to 31, throughout period covered (1919-1935). The total shipments of the reporting members in 1933 represented about 43 per cent of the value of woodworking machinery produced that year, according to the Census of Manufactures. Corresponding rates for earlier biennial census years are as follows: 1931, 47 per cent; 1929, 54 per cent; 1927, 52 per cent; 1925, 48 per cent, and 1923, 45 per cent. Published currently by United States Department of Commerce in the Survey of Current Business.

equipment and other durable goods.

Steel, Autos and Machine Tools Lead Recovery

Every one of the 16 products shown in the accompanying charts has recorded a substantial expansion since 1932. The most conspicuous records for 1936, however, were established by the automobile industry, which was the mainspring of recovery in durable consumers' goods, and by the iron and steel and machine tool industries. Last year's operating rate in each of these industries was well above the 1930 level, and, for the first time in seven years, operations were above the pre-depression rate. Steel ingot production exceeded that of any year excepting 1928 and 1929, although output of pig iron, reflecting the greater use of scrap, was less than in 1930 and well below the pre-depression average. Automobile production, though still considerably below the 1929 peak, was close to the totals of 1925, 1926 and 1928, three of the best years in the industry's history. The machine tool industry, proving its right to the "prince or pauper" role among industries, had a volume of orders in 1926 which was more than six times larger than when it scraped bottom in 1932. Last year's business came within striking distance of 1928.

Steel sheet production, as reported by the independent steel makers, showed only a slight increase over 1935 and was slightly below 1930 levels. Orders for fabricated steel plate for oil storage tanks, tank cars, gas holders, etc., showed a sharp increase in 1936, with a volume about equal to 1930 and close to the pre-depression average.

Steel Boilers Still Lag

Steel boilers still lag behind many of the other heavy industries. Although new orders have increased steadily each year since 1932, the 1936 volume was little more than half the pre-depression average. Shipments of malleable castings continued to increase in 1936 for the fourth successive year, but although last year's shipments were larger than in 1930, they were still below the pre-depression average.

Woodworking machinery, reflect-

ing demand from the furniture and woodworking industries, presents a sharp contrast to machine tools, which have benefited from the brisk recovery in the automobile industry. Shipments of woodworking machinery have increased steadily since 1932, but are still only slightly above the low levels of the depression. The 1936 volume was little better than half that of 1930 and only a fraction of the pre-depression average.

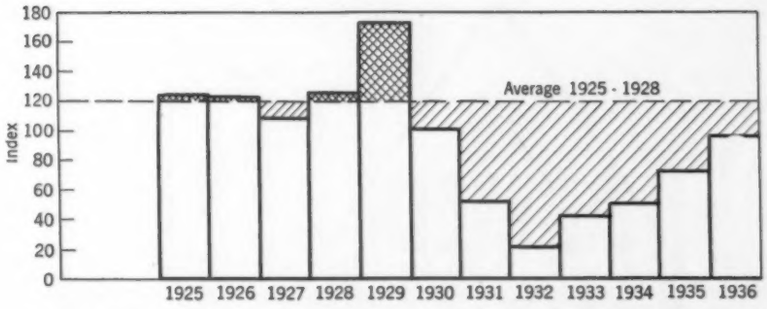
Other Industries Below 1930

None of the heavy industrial equipment industries has responded to recovery as decisively as have the steel and machine tool industries. Shipments of industrial electric trucks and tractors showed a further substantial gain in 1936. However, although volume last year was four times as large as in 1932, it was still somewhat below 1930 and considerably less than the pre-depression average. Shipments of electric overhead cranes and industrial electric locomotives have registered spectacular percentage gains during the past four years, but chiefly because the volume fell almost to zero in 1932. Recovery since that year still leaves these industries operating at only a fraction of capacity and at considerably less than half the rate prevailing during the years before 1929.

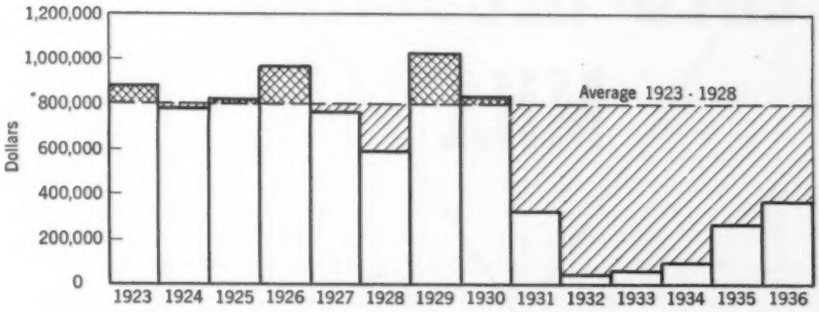
The railroads, in spite of increasing traffic and improving earning records, have not yet returned to the capital goods market with anything like the volume of purchases made during the twenties. Shipments of new freight cars, which became almost a minus quantity at the bottom of the depression, were four times as large last year as in 1935. Last year's volume was little more than a third of the 1923-1928 average, and the railroads must still place an enormous amount of business before their rolling stock will again be restored to a satisfactory condition. Railroad orders placed during the last few months, however, show a sharp and substantial increase.

One of the most encouraging signs of improvement in the capital goods industries is the brisk, though belated, recovery in residential building. Residential contracts awarded during the four years from 1925 to 1928, averaged

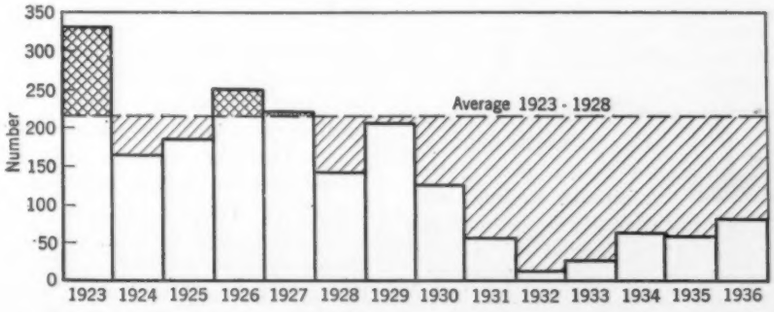
(CONTINUED ON PAGE 99)



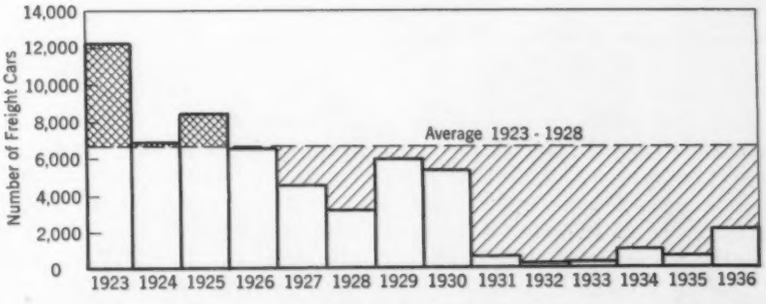
INDUSTRIAL ELECTRIC TRUCKS AND TRACTORS—SHIPMENTS (Monthly Averages). Compiled by United States Bureau of the Census, representing shipments of industrial electric trucks and tractors by 10 leading manufacturers comprising the greater part of the industry. Published currently by United States Department of Commerce in the Survey of Current Business.



ELECTRIC OVERHEAD CRANES—SHIPMENTS (Monthly Averages). Compiled by the Electric Overhead Crane Institute from reports from 11 manufacturers estimated to cover 98 per cent of the output. Published currently by United States Department of Commerce in the Survey of Current Business.



INDUSTRIAL ELECTRIC LOCOMOTIVES—SHIPMENTS (Quarterly Averages) Compiled from quarterly reports to the United States Bureau of the Census, from 10 manufacturers comprising practically the entire industry. Published currently by United States Department of Commerce in the Survey of Current Business.



NEW FREIGHT CARS—SHIPMENTS (Monthly Averages). Data on shipments of equipment manufacturers obtained from the American Railway Car Institute. Published currently by United States Department of Commerce in the Survey of Current Business.

ARMCO COMPLETES COLD REDUCTION MILL

TO meet the needs of the automobile industry for wider sheets, the American Rolling Mill Co. has installed a wide cold reduction mill at its East works in Middletown, Ohio, at a cost of $3,500,000. This involved the widening of its hot strip mill and the expansion of certain other processes. Although the cold reduction mill has been operating for several months, the necessary auxiliary equipment has only recently been completed.

This new cold reduction mill embodies features of interest to those engaged in the manufacture of steel sheets.

Coils are rolled on the continuous hot strip mill and carried to the cold reduction mill on an underground gravity conveyor. The maximum width of the coils is 74 in. and the average gage is 0.090 in.

The coil build-up unit consists of a decoiler and shear, a 1200-kva. flash buttwelder, a flash trimmer and a re-coiler. The decoiler unwinds the coils, the shear uniformly trims the ends, the pinch rolls push the coil into the welder, where it butts against the sheared end of the strip preceding it, and in that position the weld is made. The flash from the weld is then removed and the strip is re-coiled. A maximum of six coils, averaging 200 ft. each, may be so joined, making a continuous strip 1200 ft. long. The coils are then transported by a gravity conveyor to the coil storage building.

Continuous Pickling

Next in line comes the continuous strip pickler. Each coil passes through a decoiler, shear and stitcher. The front end of each coil is then stitched to the rear end of the preceding one. Pinch rolls then push the strip into a looping pit, from which it is carried upward into the pickling tanks, the entrance to which is approximately 9 ft. above the floor level. This is necessary because the bottom of the tanks are located 4 ft. above the floor level for convenience in making inspection and repairs.

The strip now passes through four 50-ft. steel pickling tanks which are rubber-and-brick lined; then through two 30-ft. rinse tanks equipped with hydraulic sprays of 300 lb. pressure, and finally through a hot air dryer. As it passes from tank to tank, it runs over rubber rolls set in roller bearings. Acid is fed into the pickling tanks, and the temperature of each is recorded on a pyrometric chart. Pinch rolls on the far end of the strip pickler pull the strip through the various tanks. As it emerges from the dryer a tachometer records the speed of the strip. All tanks are equipped with automatic recording temperature indicators and controls.

The stitched portion is now removed and the welded strip passes into a re-coiling and oiling unit where the original lengths are recoiled and oiled; then it passes by means of a gravity conveyer to scales where the coils are weighed. From here they go into storage into a combination coil storage, shearing, temper rolling and box annealing building. All coils are delivered to and from the cold reduction mill by gravity conveyors when needed for processing. It is not necessary to store coils near

the cold mill where they might interfere with operations.

Housings, rolls, bearings, screwdowns, and mill drives sizes for the cold reduction unit were determined after a very careful analysis of all the factors involved in the cold reduction of wide strip. The unit consists of a decoiler, a sticker, three four-high roll stands, and a coiler.

Each roll stand has two working rolls, 19 in. in diameter, and two back-up rolls 49 in. in diameter, and both 80 in. in length, capable of rolling a strip 74 in. in width. The back-up rolls revolve in oil lubricated bearings. The working rolls are mounted in roller bearings. Back-up bearings are lubricated from a central system which is completely protected by a light and bell signal to insure a continuous supply of oil.

o o o

THE continuous pickling unit, where the strip passes through four pickling tanks and two rinse tanks.

o o o

Rolls Balanced Hydraulically

Both the work rolls and backing up rolls are balanced by means of hydraulic cylinders operating from a self-contained hydraulic system connected with cylinders located in the roll chucks. Rolls are changed by a portable motor operated roll changing rig.

Screwdowns are double motor operated through a combination of spur and worm gears which are roller bearing mounted. The speed of both screws is synchronized by means of a magnetic clutch connecting the two motors. Electric controls for mill motors, screwdowns, etc., are all located on the mill housings convenient to the operators.

Each stand is independently driven from 1500-hp. d.c. motors, 300 to 600 r.p.m., having a two-to-one speed range on full voltage through separate gear reduction and mill pinion units. The drives consist of separate primary drives from the pinion stands, each pinion stand being equipped with interchangeable pinions which are connected to the work rolls by universal type spring balanced spindles. The speed range is as follows: No. 1 stand 200/400 f.p.m., No. 2 stand 250/500 f.p.m., No. 3 stand 300/600 f.p.m.

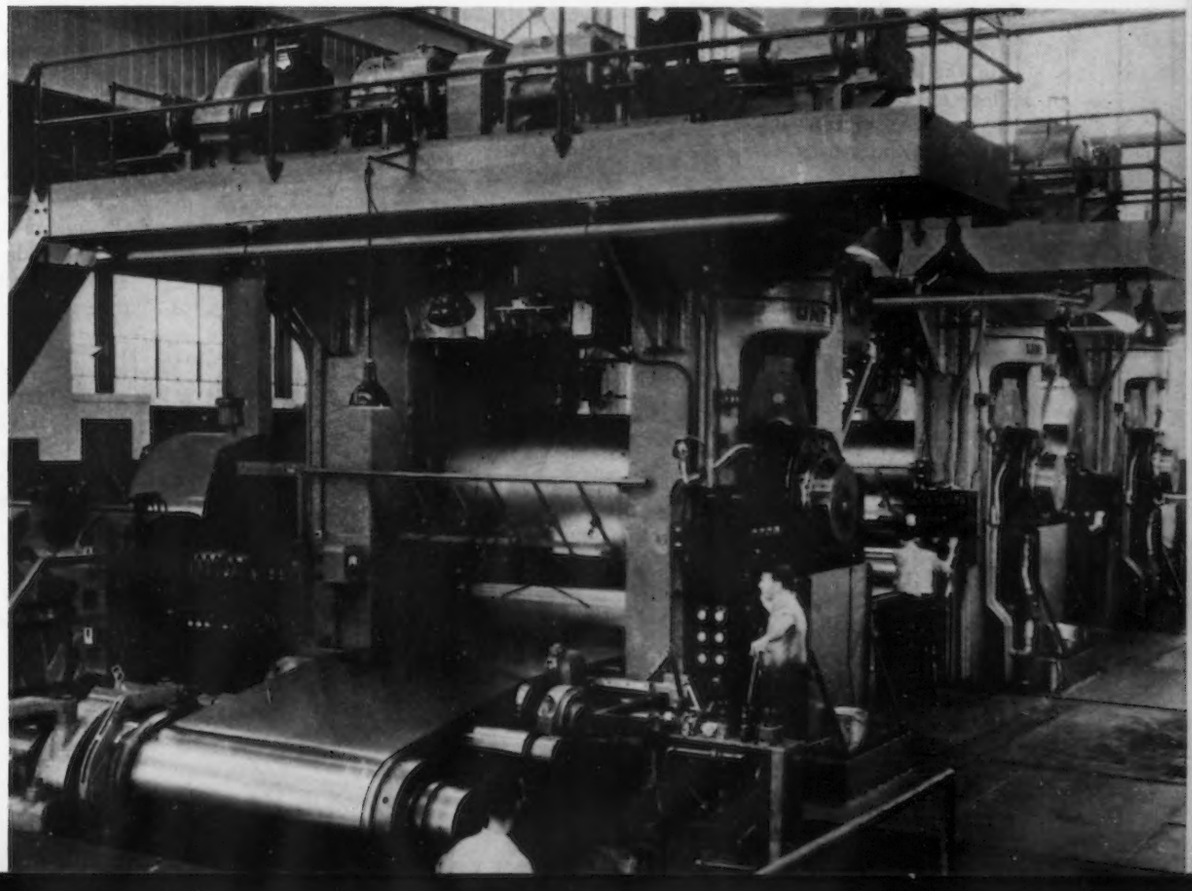
Mill motors are supplied by a synchronous motor generator set made up of a 5750-hp. motor connected with two 2000-kw., 600-v., d.c. generators.

All three stands are equipped with a roll coolant system located

o o o

ARMCO'S new cold reduction unit rolling strip, with the coiler in the foreground.

o o o



ANNEALING department, showing seven of the 18 annealing furnaces. Inner covers are made of a special alloy for longer life.

in the basement under the pinion stands and designed to maintain or vary roll contour by means of a suitable fluid applied to roll and strip surfaces. The coolant system has a capacity to deliver 200 gal. of fluid to each stand, or a total of 600 gal. per min.

On the delivery end of the mill is located the coiler. The coiled strip now passes back into the coil storage and annealing building.

Most strip sold in coils is annealed and processed by a coil temper mill, 14 in. and 27 in. x 58 in., and then into a tight coiling machine.

That which is to be marketed in sheet form is taken to another decoiler, where it is side trimmed, cut to length by a flying shear, oiled and automatically piled. The drive on the side trimmer is automatically controlled so there is no back pull on the shear.

The scrap from the trimmer is fed into a machine which forms it into balls.

In the annealing department 18 bell-type box annealing furnaces are employed. The sides of the inner covers are made of special heat resisting alloy steel which greatly lengthens their service life.

Ten of the furnaces have a capacity of one pile of sheets; in each of six furnaces two piles can be heated; while in each of the remaining two furnaces four coils can be annealed. All are pyrometrically controlled, while proportioning valves control the flow of fuel and air.

Pyrometer recording instruments are located in a small adjacent building, with all recordings at five points.

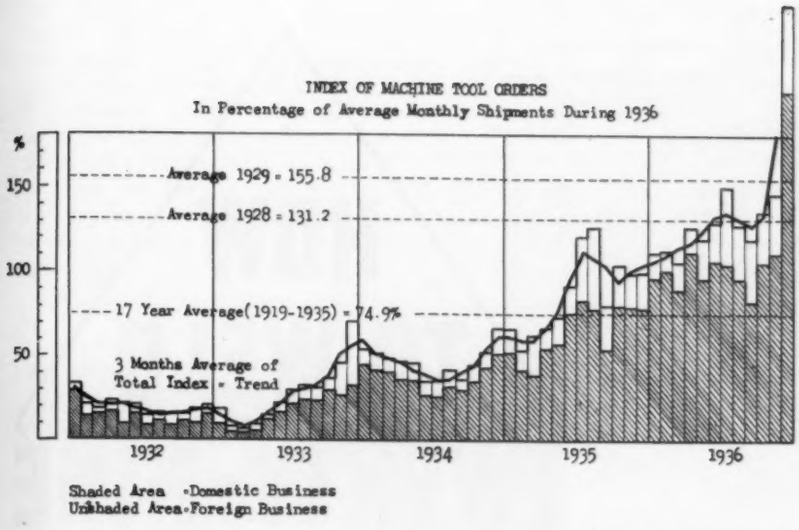
After annealing, the sheets are transferred on an electrically driven lorry car to another part of the plant where the two-high temper rolls are located.

In designing this new addition Armco engineers spared no effort to make the new unit efficient and economical. Special attention has been given the locating of equipment, the placing of controls convenient to the operators, and other points which make for efficiency but are sometimes overlooked. All buildings are well lighted and properly ventilated. Because such a high degree of precision is required in the cold reduction of sheets, the machinery has been painted in pleasing colors to encourage the operating personnel to take a greater interest in properly maintaining and operating the equipment.

In order to furnish wide coils for the cold reduction mill, it was also necessary to widen the continuous hot strip mill completed in 1929 so coils 74 in. wide could be rolled. This mill originally consisted of 11 stands—four two-high and seven four-high.

In order to roll thinner gages, a twelfth four-high stand was added. This reconstruction work was carried on without interrupting production, which represents an unusually difficult accomplishment.

Completion of these improvements completely modernizes the Armco East works plant at Middletown.



Machine Tool Sales in 1936 Exceeded Only by 1929; December Highest Month on Record

THE revised index figure for December sales of machine tools, as calculated by the National Machine Tool Builders' Association, is 257, instead of 260.6, as shown in the preliminary report (THE IRON AGE, Jan. 14, p. 94). The revised figure, however, still stands as the highest point for any month on record. The nearest approach to it was January, 1920, at 231. The 1929 highest monthly index was 186, recorded in February of that year. Increased volume was general, the association states, at least 75 per cent of the companies reporting.

"There are a number of factors contributing to the rise," says the association. "The one that comes to mind first is the fact that prices are rising in line with the higher costs of building machine tools. The index, representing dollar volume of business placed, directly reflects price increase.

"A second factor is the realization on the part of customers that growing costs in their own plants, due to higher prices for materials, higher wages, and heavier taxes, can be offset only by economies in production processes. The long postponed replacement of obsolete machines and related eqipment is just beginning in many plants.

"A third factor is the extended deliveries that are now the rule for most types of machines. Undoubtedly customers are anticipating requirements as far as possible in the hope of having adequate equipment six months or more hence."

Foreign orders in December increased over those in November.

The average index of total orders for 1936 is 136.3, which exceeds the average of 131.2 for 1928 and leaves only the 1929 average of 155.8 as outdistancing 1936.

Industrial Plant of New Design

THE latest trends in industrial plant design are represented in the building illustrated, which was designed and is being erected by the Austin Co., Cleveland, for the Penn Electric Switch Co., at Goshen, Ind. The company will move to Goshen from Des Moines, Iowa. It manufactures automatic switches and thermostatic controls.

The main single-story factory building, 210 x 340 ft., of steel frame construction, has 6000 sq. ft. of horizontal steel sash in one band inclosing the side walls between upper and lower bands of buff colored sash brick and ornamental art stone. Monitors extending the full length of the plant will supplement daylight and ventilation from the side walls.

Shafts of glass block extend to the full three-story height in the entrance tower of the two-story office building, ornamenting the street facade of the factory building. This office building, 45 x 112 ft., of steel, brick and concerte construction, will be air conditioned.

A feature of the factory is that it will be cooled in summer by fan units through which water at 53 deg. will circulate through the overhead unit heaters that will be employed for heating during the cold months.

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NEW trends in industrial plant design represented in new factory of Penn Electric Switch Co., Des Moines, Iowa.

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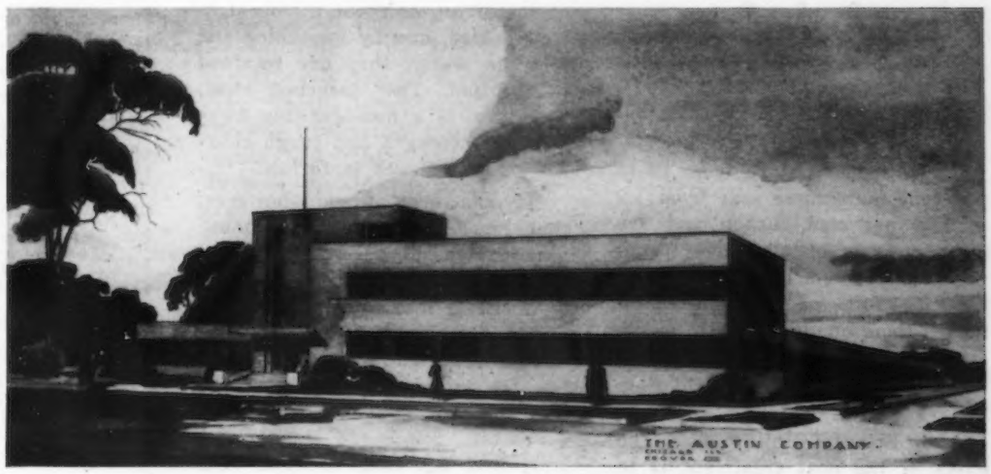


HOW TO WELD TWENTY-NINE METALS

By CHARLES H. JENNINGS

Engineer in Charge of Welding Research, Westinghouse Electric & Mfg. Co.

THIS is the fourth article in an extensive series by Mr. Jennings. The first installment appeared in The Iron Age of Dec. 24, the second in the issue of Dec. 31, and the third in the issue of Jan. 14. Subsequent chapters will appear in ensuing issues.

Austenitic Manganese Steels (Cast and Rolled)

These steels contain from 10-14 per cent manganese and from 1.0 to 1.40 per cent carbon and are comparatively brittle unless properly heat treated. Heating to 1850-1950°F. followed by quenching makes them austenitic with tensile strengths from 80,000 to 120,000 lb. sq. in. and with excellent ductility.

According to Hall ". . . The effect of the heat treatment is to bring about absorption by the metal of the flakes and veins of carbide of iron and manganese normally present in it, like flakes of mica and chips of rock in artificial stone. The high percentage of carbon in the metal is present largely in the form of these 'free carbides' which render the steel weak and brittle. On heating the steel to a high temperature, however, the carbides are dissolved in the body of the metal, as tin is dissolved in melted lead, and by quenching the piece in water, they are retained in solution. The quenched steel, therefore, is a homogeneous mass with the strength and tough characteristics of such materials.

"It has been found, however, that on heating toughened manganese steel to a dark red heat, these dissolved carbides are rapidly liberated into solution, and the microscope reveals them as a mass of fine veins and sheets intersecting the metal in every direction and breaking up its continuity. As a result, toughened manganese steel that has been brought to a dark red heat is exceedingly brittle and weak. Moreover, this is true regardless of the rate at which the steel is cooled after heating—quenching in water does not help in the least and the only way to re-toughen the steel is to heat it all over to the original treating temperature and quench in water."

Bearing this fact in mind, it is seen that as a result of welding, there is an area close to the weld that is weakened. The procedure of periodically water quenching or cooling the parts by having them partly submerged in water merely changes the location of this zone but does not eliminate it.

If welds are made on this alloy by using electrodes of a similar analysis, they are generally inferior in physical properties.

The most satisfactory welds on this steel are obtained by using a carbon manganese electrode containing about 4 per cent nickel. Such an electrode deposits high quality welds without the need of

quenching. In addition, the presence of the nickel in the electrode results in a transition zone between the deposit and the base metal and greatly reduces the harmful effect of overheating. If the carbon content of the electrode is held as low as possible, the carbon of the transition zone is diluted so that carbide precipitation is held to the minimum.

Both bare and coated welding electrodes may be used for welding manganese steels, but in general the bare electrodes are preferred. The coating on manganese electrodes is generally intended for arc stabilization rather than for the production of higher quality deposits.

The welding procedure employed is somewhat different than that generally used for other steels. The arc voltage should be about 20-25 volts and the current values as given in Table XXXVII.

The surface to be welded should be properly cleaned of rust, oil, etc., before welding. The best procedure when depositing the metal is to employ a crescent-shaped weave depositing a bead from ½ to ¾ of an inch wide. The beads of each layer should be laid at right angles to the beads of the previous layer.

When breaking the arc it is recommended to short it out and fill the crater.

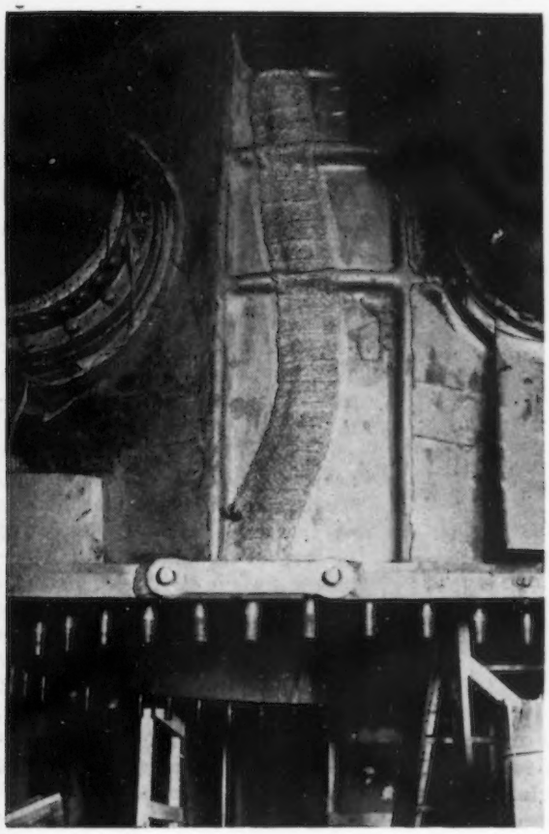
Peening is helpful in preventing check cracks which may occur in the welds in certain cases. Peening should be started at the crater and directed toward the start of the bead.

Care should be taken not to overheat the base metal or the deposited weld. If the parts become too hot or appear to take a long time to cool from a red heat, welding should be stopped until the parts have cooled. Water quenching is not recommended when using an electrode containing nickel.

TABLE XXXVII

Current Values for Manganese Steel Electrodes

Electrode Diameter (Inches)	Welding Current
1/8	75-100 amperes
5/32	100-150 amperes
7/32	150-175 amperes
1/4	175-225 amperes



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A 60-in. crack in a cast iron cylinder repaired by metallic arc welding at a saving of $11,150 and 60 days' time.

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Cast Steel

Steel castings contain only those elements usually present in steels and in proportions no greater than are customarily found in rolled steels. The analysis of steel castings may range as follows:

TABLE XXXVIII

Chemical Analysis of Cast Steel

Carbon	0.05-1.70 per cent
Manganese	0.50-1.00 per cent
Silicon	0.20-0.75 per cent
Phosphorus	0.05 per cent max.
Sulphur	0.06 per cent max.

The lower the carbon content of a melt, the more difficult it is to make a sound casting. Consequently, most commercial castings contain from 0.30 to 0.45 per cent carbon. The fact that the carbon content is in the medium carbon range results in air-hardening and the formation of hard areas at the fusion zone.

From the standpoint of weldability, steel castings are similar to rolled steels. They can be welded with the same electrodes, both bare and coated, and the resultant welds will have good strength. The ductility and fatigue properties will depend greatly upon the type of electrodes used, but will be comparable to those obtained on rolled steels of a similar analysis.

The physical properties of welded cast steel are given in Table XXXIX.

TABLE XXXIX

Physical Properties of Welded Cast Steel C, 0.28; Mn, 0.86; Si, 0.47

Property	Bare Electrodes	Coated Electrodes
Yield point, lb. sq. in.	40,000	50,000
Tensile strength, lb. sq. in.	58,000	70,000
Elongation per cent in 2 in.	6.0	26.0
Elongation per cent by free bend	10.0	35.0
Endurance limit, lb. sq. in.	15,800	26,000

If the castings are of such an analysis that air-hardening is obtained from welding, two corrective methods can be used. The first method consists of preheating the parts to about 300-500°F. be-

(CONTINUED ON PAGE 101)

POWER TRANSMISSION

Improvements in variable speed devices, the "Energy" drive, better belting technique and advances in electrification mark power transmission progress.

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

AMONG the minor, but still important developments of the past two years in the field of industrial power transmission, should be noted improvements in motors, clutches, bearings, rubber belting, and other miscellaneous items. Most of these developments are in the nature of improvements in equipment already existing; a few are genuinely new. All of them bring to the general problem of applying power effectively and economically to the machines of industry, new factors of cost reduction, and therefore are worth serious study.

Motors

The recent developments in electric motors adapted to industrial power transmission uses have been principally along the lines of (1) Detailed improvements in the design and construction of present types, with a view to obtaining better electrical service characteristics and more dependable mechanical life, (2) Adaptations of present types of motors to special problems of machine tool and special equipment installations, largely through the development of improved types of face and flange type end shields for mounting the motor integrally with the machine, (3) The development of the combination of motor and disc-type brake for closer control of operation, and (4) The development of high speed induction motors for direct drive of high-speed equipment. With these should be mentioned again the great forward strides made in the development of the combination motor-transmission units already described, in the form of gear-motors, or variable speed transmissions.

Two points of recent usage deserve particular mention. The first has to do with the advances made in the design of face and flange type end shields for direct connection of the motor to the machine. Fig. 25 shows such an end shield connected General Electric motor driving a centrifugal pump. This makes a very compact, self-contained unit. The use of these motor mountings greatly simplifies the problems of machinery design. The motor shaft is brought directly into the driven machine, eliminating the use of couplings, and sometimes a shaft in the driven machine. Thus, vibration that might be caused by unbalanced couplings is reduced or done away with entirely and a compact integral unit of drive and machine is obtained. Fig. 26 shows a G. E. disk brake similarly mounted, integral with the squirrel cage induction motor.

The second motor development of note is in the field of the high-speed induction motor, operating at 3000 to 3600 r.p.m. Such motors, direct connected, improve power factor and increase drive efficiency, effect space economies and provide long, dependable service. Fig. 27 illustrates a typical motor of this type, as made in sizes from 250 h.p. to 700 h.p. It is a G. E. squirrel cage induction motor equipped for base ventilation, and requiring no force-feed lubricating system.

Among the many special problems of modern machine tool drives successfully solved by direct motor application may be mentioned the Giddings & Lewis horizontal boring, milling and drilling machine (Fig. 28) equipped with Westinghouse motor and push button control, and the Hill surface grinder equipped with Westinghouse ver-

tical, totally enclosed, fan-cooled motor.

The Low Power Factor Problem

One of the chief problems of individual motor drive arises in connection with the low power factor operation of a large number of induction motors. Where it is not possible to take advantage of the load-levelling characteristics of modern group drive, with its consequent high power factor operation, it is usual to install either capacitors or synchronous motors to correct bad conditions. At the same time many motor manufacturers have provided special types of induction motors, such as the double squirrel cage, the wound rotor, the slip ring and the built-in capacitor types, to give better operating characteristics under various abnormal starting and peak load conditions. Even so, the general purpose squirrel cage motor continues to rule as the prime favorite for 90 per cent of industrial a.c. applications, notwithstanding the low power factor drawback.

In an effort to counteract low power factor without resorting to capacitor-banks or synchronous motors, the Ideal Electric & Mfg. Co. offers two lines of motors for direct drive. The Noel polyphase-capacitor motor is an induction motor wherein a static condenser is permanently connected to a special winding in the same slots with the regular line winding, to supply the exciting or magnetizing current. This motor is built in all starting

(CONTINUED ON PAGE 103)

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AT RIGHT

FIG. 25. End-shield flange-connected G.E. fan-cooled motor driving centrifugal pump.

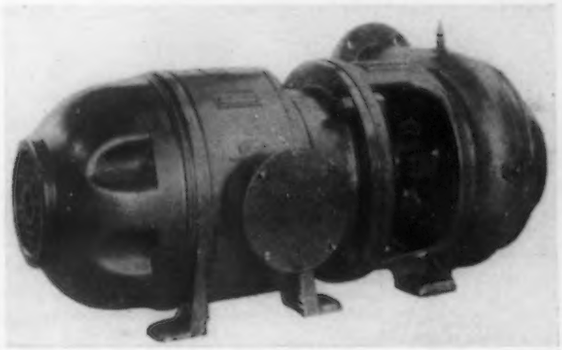

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FIG. 26. Disk brake integrally mounted on G.E. squirrel cage motor.

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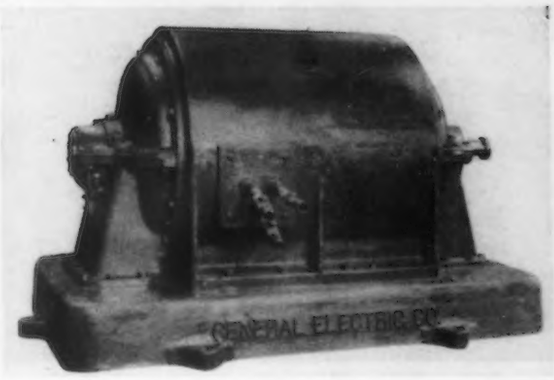
FIG. 27. G.E. 3600 r.p.m. base ventilated polyphase squirrel cage induction motor.



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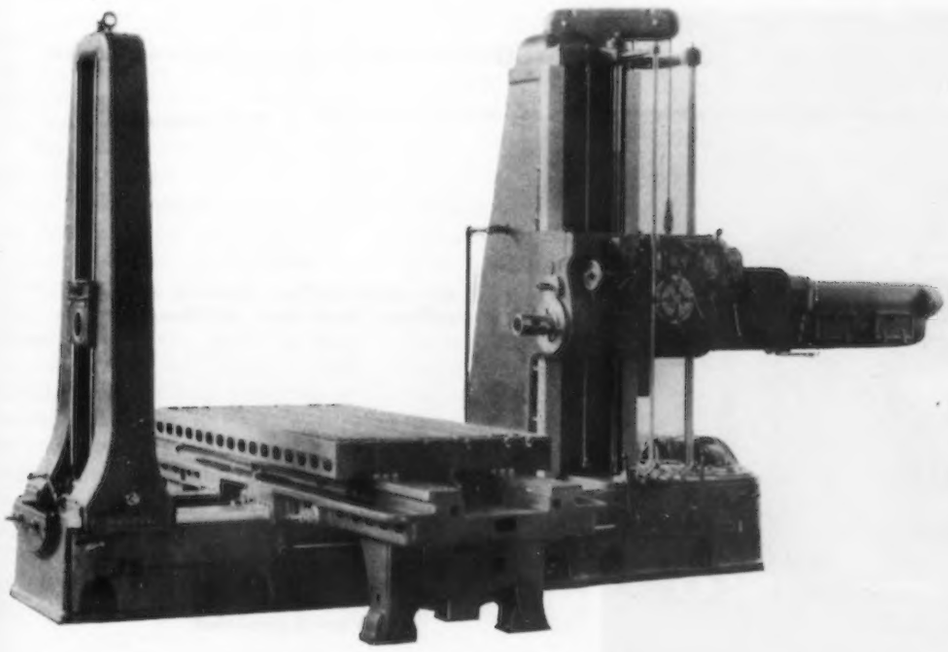

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FIG. 28. Westinghouse motor and push button control on Giddings & Lewis horizontal boring, milling and drilling machine.

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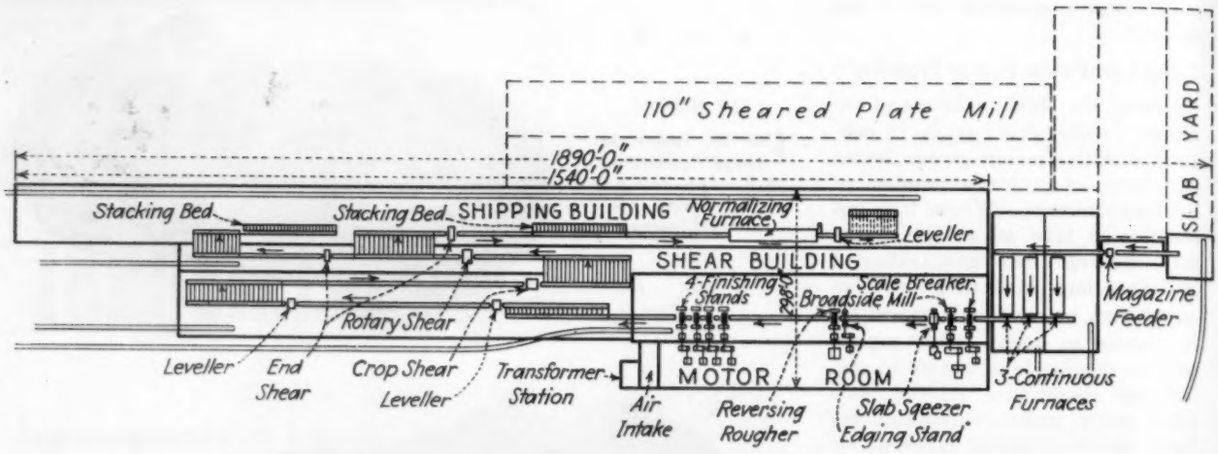

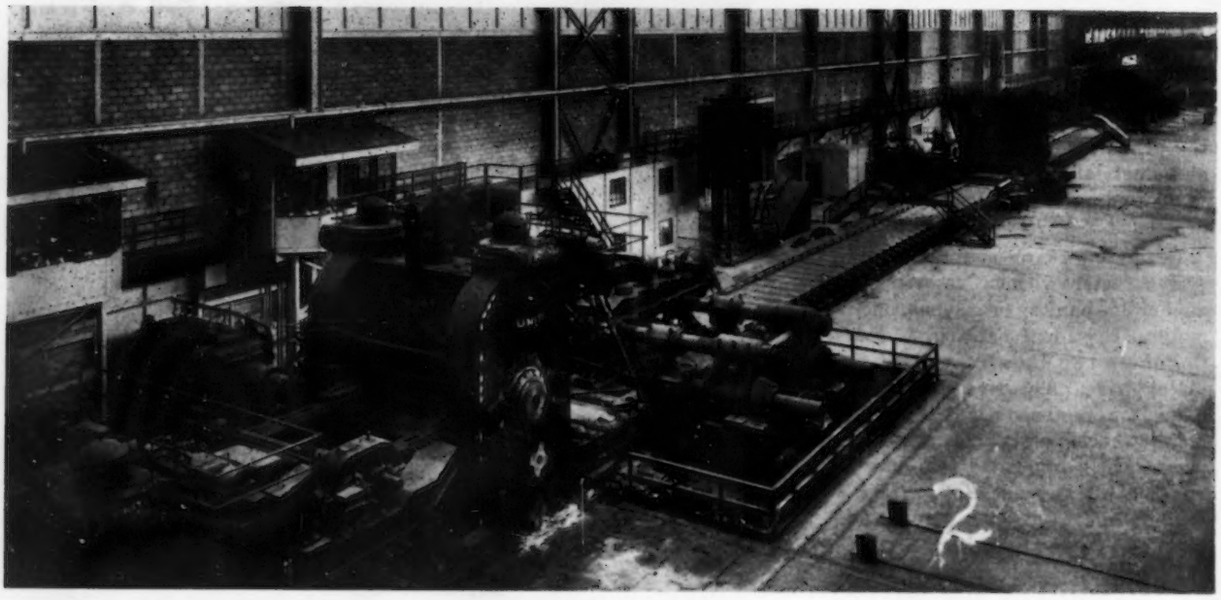

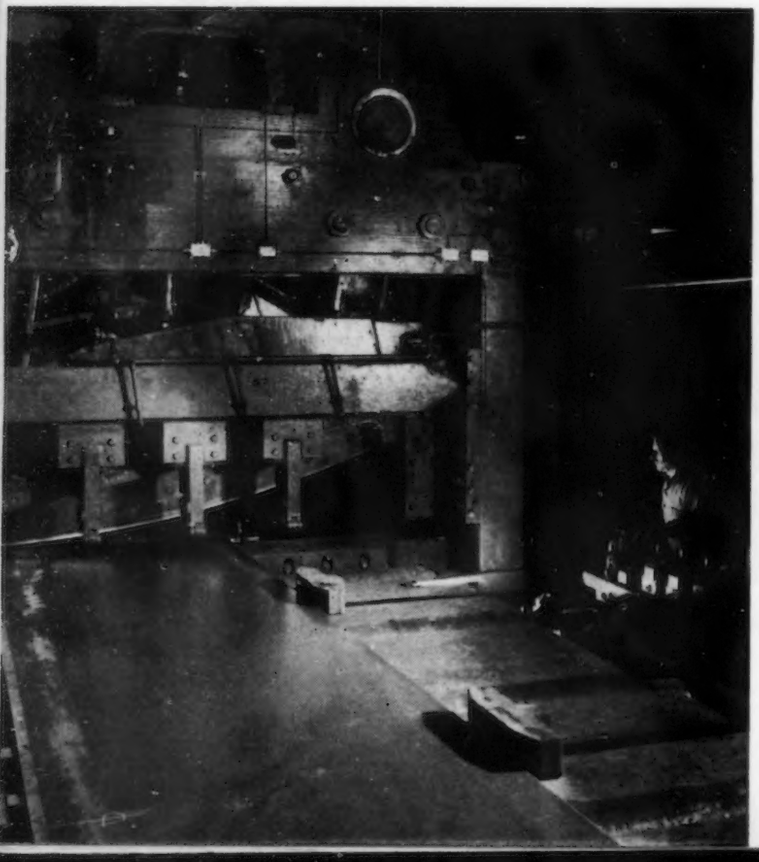

AT TOP

PLAN showing arrangement of equipment and flow of material.

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ABOVE

THE new semi-continuous plate mill of the Carnegie-Illinois Steel Corp. at Homestead, Pa.

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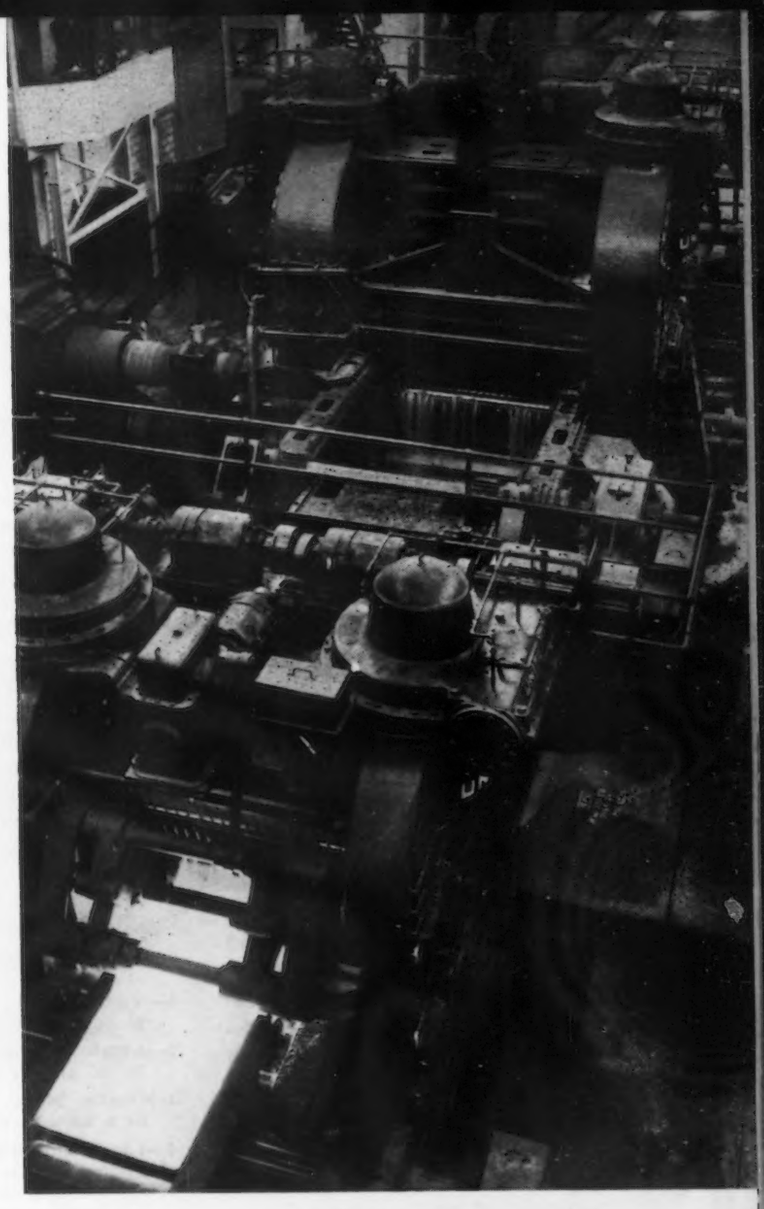
AT LEFT

A ROCKING type shear, developed by A. W. Soderberg, chief engineer of the Homestead works, is a feature of the new installation. This 80-ton shear cuts a 90-in. plate with ease so that the bow is eliminated.

New Homestead Semi-Continuous Plate Mill Sets High Efficiency Standard



SCALE breaker and broadside mill.

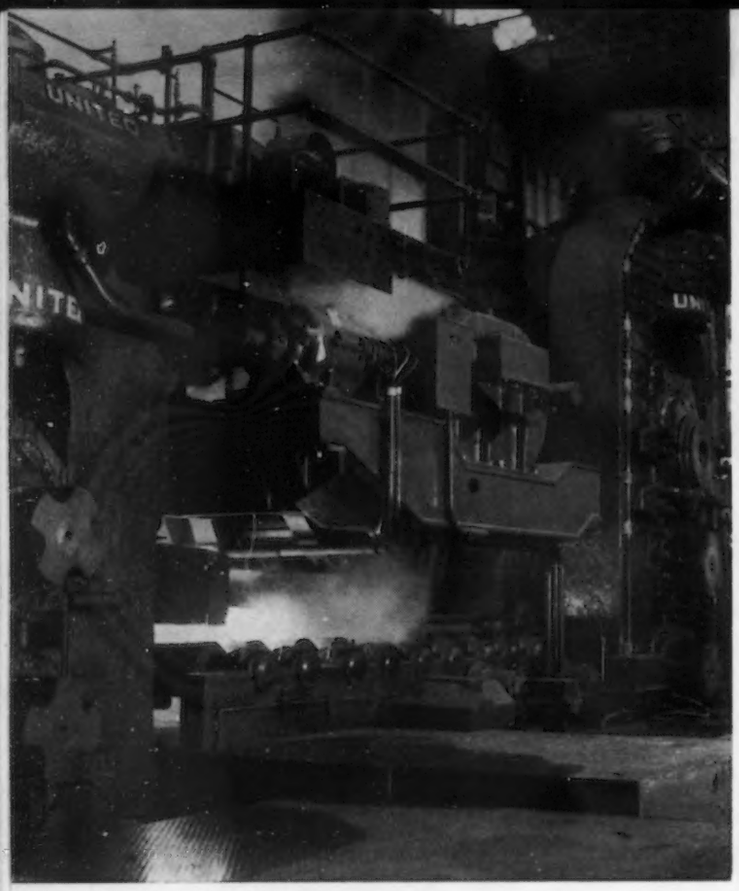
THE 100 in. semi-continuous sheared plate mill just put into operation by the Carnegie-Illinois Steel Corp. at its Homestead Works is a revelation in efficient production. Excavation was started for this plant on Dec. 3, 1935, and on Dec. 1, 1936, rolling operations began.

The entire rolling process, from the time a heated slab leaves the furnace until it reaches the last finishing stand, takes less than 2 min. Normal operation contemplates three slabs going through the mill at the same time, a plate leaving the finishing train on an average of every 40 sec. With a six day week, rolling ordinary commercial plate, this mill is expected to turn out 729,000 gross tons of finished product each year.

The outstanding characteristics of plate from this mill are accuracy, uniformity of gage, freedom from shear bow and a surface finish comparable to that now found on high quality hot rolled strip. Cor-Ten, Man-Ten, Sil-Ten and other alloy steels as well as commercial carbon steel will be rolled in plate ranging in width from 20 in. to 90 in. and from 3/32 in. to ⅝ in thickness. The run-out table after the finishing train will handle plate up to 150 ft. in length.

Slabs which may range from 22 in. to 54 in. wide, 3 in. to 9 in. thick and 48 in. to 180 in. long come to the new mill from the old slabbing mill at Homestead, being stacked six to eight high on a motor driven roller table which delivers them to a magazine feeder. This in turn discharges one slab at a time to the roller table in front of the reheating furnaces. Three continuous type double row Rust furnaces are now installed, provision having been made for the installation of a fourth unit should occasion require it. These furnaces are 18 ft. wide by 82 ft.—10 in. long and each is capable of heating 50 gross tons of cold slabs per hour.

The furnaces are all equipped



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THROUGH rolls on the left a 1½-ton slab of white hot steel passes to receive its first reduction and to have scale broken and removed from its surface. The slab is entering upon the turn table, which will turn it sidewise to enter the broadside mill to be reduced further in thickness.

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with carborundum type recuperators and operate under fully automatic temperature control which includes B.t.u. proportioning. Normal operation is with by-product coke oven gas, but the proportioning control will maintain a constant B.t.u. value of the fuel regardless of whether natural gas, coke oven gas, or any combination of those two gases may be used.

Each furnace is charged by two motor operated slab pushers which work separately or in unison as needed. Slabs up to 7 ft. 6 in. long are charged in two rows using the pushers separately, or slabs up to 15 ft. long may be charged in a single row, both pushers working together. Main furnace doors are motor operated and the furnaces are completely insulated and steel jacketed to conserve heat and improve working conditions.

Mill Equipment

As the heated slabs leave the furnaces, they advance over a heavy duty delivery table to the mill, which consists essentially of:

1—2-high scale breaker, 36 in. x 100 in.

1—4-high spreading stand or broadside mill, 42 in. and 52 in. x 120 in.

1—Horizontal slab edging press.

1—Vertical roll edger (reversing), 40 in. x 10 in.

1—4-high reversing roughing stand 36 in. and 54 in. x 100 in.

1—Double pinch roll device serving as a scale breaker.

4—4-high finishing mills, 27 in. and 54 in. x 100 in.

Runout and transfer tables, levelers, crop, rotary and end shears, stacking beds, etc.

All rolling stands and considerable other equipment such as mill tables, rotary and scrap shears, etc., were designed and built by the United Engineering & Foundry Co., working in conjunction with the Carnegie-Illinois engineers at Homestead. Exclusive of U. S. Steel Corp. subsidiaries, 244 different contractors were engaged in the work connected with building this new mill.

The two-high scale breaker operates at 190 ft. per min. and is capable of handling slabs straight through or spreading them up to 94 in. After passing this mill and a hydraulic descaler, where jets of water at 1000 lb. per sq. in. impinge at an angle on both top and bottom surfaces of the slab to remove the furnace scale loosened in the mill, the clean slabs advance to a broadside mill. This stand, which is preceded and followed by specially designed slab turning rigs, is a four-high non-reversing mill 42 in. and 52 in. x 120 in. operating at approximately 185 ft. per min. In this mill slabs can be spread in a single pass to a maximum of 96 in. wide and 110 in. in length. A heavy duty motor operated pusher at the entry side of this stand assures that the slabs enter the rolls squarely.

On leaving the broadside mill the slab advances to a second slab turner which turns it 90 deg. to its original lengthwise position ready to move on to the slab reducer to square up its edges and true its width. This unit has a 7 in. stroke and is capable of 3 in. penetration on a 6 in. thick slab. It is equipped with 16 ft. heads. The eccentric shaft is forged steel 26 in. in diameter and has a 3½ in. throw. Special care was exercised in the design of this slab reducer to avoid the possibility of upsetting and operation has demonstrated that no difficulty of this nature will be experienced.

Two sections of roller tables advance the formed slab approximately 120 ft., under a hydraulic descaler, to a four-high 36 in. and 54 in. x 100 in. reversing mill where a series of three, five or seven passes brings the slab to the desired size for finishing. This stand is the first large four-high reversing hot mill ever installed in a tandem mill and constitutes one of the many unique features in this new plant. The 40 in. x 10 in. vertical edger which precedes the reversing mill is used merely to maintain constant slab width.

Secondary Scale Breaker

Immediately preceding the finishing train a unique double pinch roll device has been installed to act as the finishing scale breaker. Instead of the customary mill stand two rolls operating under spring pressure give the slab a pinch which serves to crack and loosen the secondary scale just before the slab passes under the hydraulic descaler.

The finishing train, which consists of four stands of four-high 27 in. and 54 in. x 100 in. mills, preceded by a hydraulic descaler to remove the secondary scale, is separated from the reversing mill by three sections of roller tables. The section which receives the slab as it comes from the reversing mill is designed to operate at 400

ft. per min. and the next two sections at 150-600 ft. per min., the speeds being adjustable according to the rate of cooling and size of the slab so that it will enter the finishing train at the proper temperature.

Timken tapered roller bearings were furnished for the four-high reversing and finishing mills while the scale breaker and broadside mill were equipped with babbitt bearings of a new totally enclosed chock type. All back-up roller bearings are 33 in. x 48 in. x 31 in. and the finishing mill work roll bearings 18 in. x 23½ in. x 11 in., those on the reversing mill being 24 in. x 31 in. x 14¼ in. At 500 r.p.m. the back-up bearings have a rating of 1,133,280 lb. radial load and 217,000 lb. thrust load.

Ground cup and cone spacers are used on these bearings, which are all four-row assemblies, to give a pre-adjusted setting. The inner filler ring is shrunk on the roll neck and the chock has a special lip which fits close to the inner race of the bearing, making practically a sealed assembly when the bearing and chock are removed. Screwdowns on all the stands are likewise equipped with Timken bearings, as are many other units such as drives, levelers, shears, tables, etc. Magnetic clutches between the motor shaft extensions on the screwdowns permit alinement of the rolls and synchronous speeds of the motors. Selsyn indicators are connected with each screwdown, readings showing in the operating pulpit for the roughing scale breaker, broadside mill and reversing mill and on the mill housings of the finishing stands so that the operator knows his roll settings at all times and can adjust them quickly and accurately.

A special feature in connection with the reversing mill lies in the control mechanism, which can be pre-set. After the proper draft has been determined for each pass the electrical controls are set and continue to function automatically, making the required changes in roll setting for each pass. When the slab advances to the finishing train the controls automatically restore the initial setting, ready to start the cycle again.

Top back-up and work rolls are hydraulically balanced, the back-up roll by means of carrier bars and links suspended from cylinders mounted in the top housing separator. The top work roll is balanced by hydraulic cylinders located in the bottom roll chocks. These cylinders operate under a pressure of 1500 lb. per sq. in. This system of roll balancing avoids the necessity of disconnecting any hydraulic connections when back-up roll changes are required.

To control rolling pressures and thus avoid undue strain on the mill equipment, all four-high stands are equipped with United type pressure-meters. These utilize the stretch in the mill stand housing to actuate indicating and recording instruments located in the operating pulpits.

Inductance type strain gages are built into the mill housing, no additional height being required nor is there any difficulty involved when rolls are changed. The general accuracy of this roll pressure measuring equipment is to within ½ of 1 per cent when it is in proper condition.

Space for Additional Finishing Stand

It will be noted from the layout that sufficient space has been provided to permit an additional finishing stand to be installed before and after the present finishing train. This would make it possible for the mill to roll heavy wide strip or sheet if desired, as well as the accurate plate now being produced.

The finishing train is equipped with specially designed motor operated guides and loopers and the entry and delivery guides equipped with motor operated pull-backs to facilitate roll changing. Likewise the approach side of each of the last three stands in the finishing train is equipped with a set of guards or "horns" to safeguard the mechanism from damage should a cobble occur while rolling heavy plate. Sections of roller tables are used in this train instead of the customary chutes to handle the heavy, wide plate smoothly and easily and avoid scratches.

All approach and delivery roller tables are equipped with motor operated quick setting side guards and guides, and particular care was used in finishing all surfaces which come in contact with the metal as it enters and leaves the finishing train to avoid the possibility of scratching.

A large, well lighted, well ventilated and well heated room is provided adjacent to the mill build-

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THE four-high finishing train comprises four stands.

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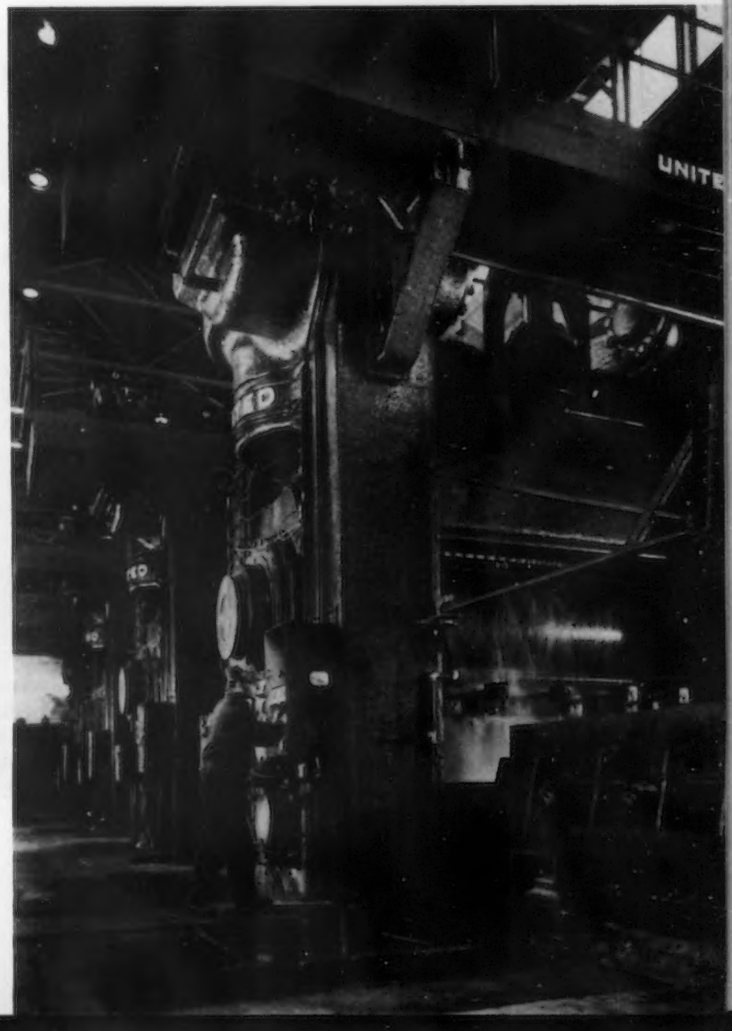
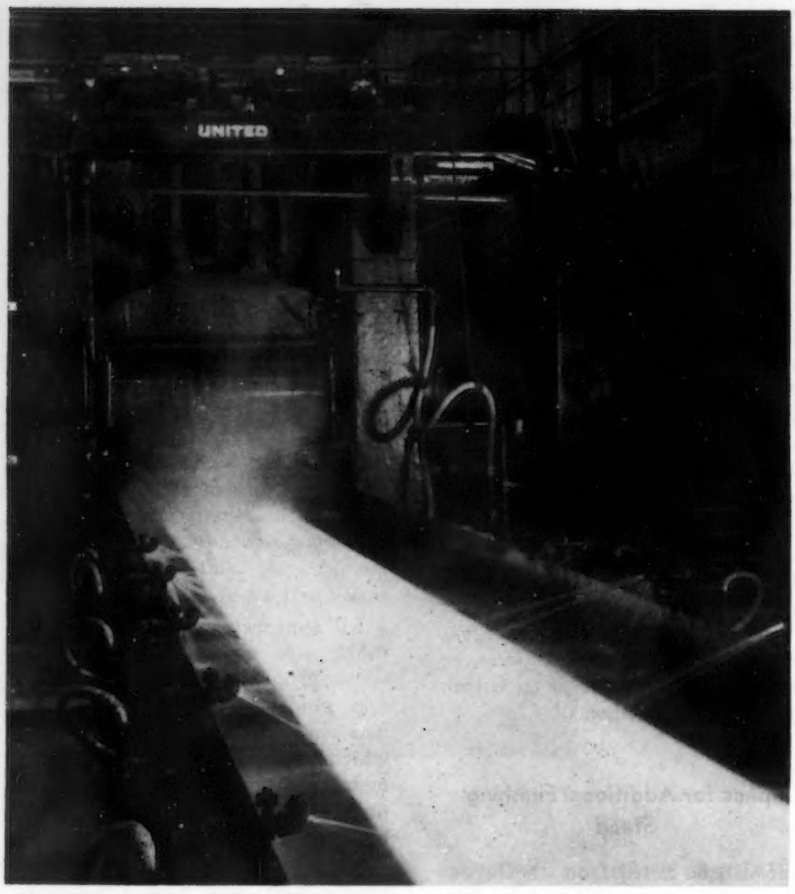




A SLAB of steel greatly elongated and reduced in thickness through the reversing roughing stand (in the background) is being cooled by jets of cold water spray as it is moved on conveyor rolls toward the four-high finishing stands.

ing for roll turning and grinding, bearing storage and maintenance. Present equipment includes a 60 in. x 20 ft. roll turning lathe, a 60 in. x 20 ft. roll grinder and a degreasing machine for use in bearing maintenance. This shop is served by a 100-ton crane and a specially designed transfer car for taking roll assemblies to and from the roll shop.

Operating Pulpits

Four glass enclosed operating pulpits, 12 ft. above floor level give the mill operators ideal working conditons and enable them to see clearly what is happening. The pulpit controlling the scale breaker and first slab turning rig is on the drive side of the mill, as is also the pulpit from which the slab pusher, broadside mill, second turning rig and slab reducer are controlled. The operating pulpit from which the four-high reversing mill and reversing roll edger is controlled is on the operating side of the mill, immediately in front of the stand so that the operator has a clear view not only of his mill stand but also of the approach and delivery tables. The finishing train is similiarly handled from a pulpit centrally located on the same side.

One large room, ventilated with filtered air under a slight pressure to keep out any dust, houses all the main motors, gear drives, motor generator sets and switchboard equipment. Four 125,000 cu. ft. per min. fans are used for forcing the filtered air into this room and two 65,000 cu. ft. per min. booster units, one being held in reserve, furnish air to cool the big reversing mill motor.

At one end of the motor room is the 1000 hp., 6600 volt, 500 r.p.m. General Electric motor that drives the scale breaker. Next is the Westinghouse 4500 hp., 370 r.p.m., 6600 volt motor that drives the broadside mill. Then comes the 500 hp., Crocker Wheeler 500 r.p.m. motor used for the slab reducer. Half way down the room is the big 7000 hp. Westinghouse motor, direct connected to the four-high reversing mill. This motor operates at 40-80 r.p.m. Beside this unit is mounted another 600 hp., 700 volt dc. compound Westinghouse motor operated at 125-408 r.p.m. and driving the vertical edger through a gear reduction. Four 5000 hp. Allis Chalmers motors connected to heavy gear drives furnish the power for the finishing train. The first three of these motors are 110-250 rpm. units and the last operates at 125-265 rpm., mill delivery speeds ranging from 655 to 1386 ft. per min. on the last finishing stand.

Runout Table

On leaving the last stand of the finishing train, the plate advances to a runout table, equipped for the first 60 ft. with a series of cooling sprays. The rollers on this table are all individually motor driven and are made of centrifugally cast iron, ground to a smooth finish. Likewise, all apron plates and skids on the transfer tables are made of cast iron with a ground finish to eliminate the possibility of scratching the finished plate while it is still hot.

To assure smooth operation, freedom from friction and power losses as well as low lubrication and maintenance charges, all roller tables with the single exception of the low speed unit which brings the cold slabs to the magazine feeder, are equipped with anti-friction bearings. Timken bearings are used on the driven ends of the rollers and cylindrical bearings on the floating ends.

From the runout table the plate is transferred by a cable type transfer to a second cooling table feeding to a specially designed roller leveler. This unit has two 12 in. x 108 in. pinch rolls and 17 leveling rolls 8 in. x 108 in. and flattens product up to 5/16 in. thick. This leveler is oil cooled and oil lubricated. On passing this unit the plate again advances to a disk or spool type cooling table divided into six sections, each driven by shunt wound motors.

A second leveler equipped with two pinch rolls 12 in. x 108 in. and 11 leveling rolls of the same size, water cooled and grease lubricated,

is at the end of the disk type cooling table and flattens product 5/16 in. thick and over. This leveler is of the same type as the preceding one. It in turn delivers the leveled and nearly cold plate to another table from which a rack type transfer mechanism moves it across to a roller table. This in turn discharges to a disk type marking table leading to a shear which crops or divides the plate as required. It is interesting to note that the product of the mill comes to the crop shear without fishtails or ragged ends, and ordinarily a 10 in. crop will square up either end.

After cropping, the plate is again transferred, this time on a chain type mechanism, to a table leading back to the rotary shear which trims the edges. So accurate is the rolling operation that practically no camber exists in the plates, and as a result only about 1 in. to 1½ in. needs to be sheared off the edges of the plate to square it up into saleable material of uniform gage and width.

The plate is again transferred, this time by a cable type transfer, to the roller tables leading to either of two rocking type end shears. These shears, designed at the Homestead plant, were built at Homestead and eliminate the difficulty known as "shear bow" which was formerly encountered in plate shearing. Four heavy pneumatic fingers hold the plate in place while a specially heat treated curved shear blade rocks across with only point contact. This results in a clean, smooth and even cut without strain and leaves the plate without any visible bow.

From the rocking type shears the plates move on to the stacking beds, passing over recording scales which automatically print tickets for each plate, giving full details as to heat number, etc. as well as weight on the ticket.

Universal Crane Service

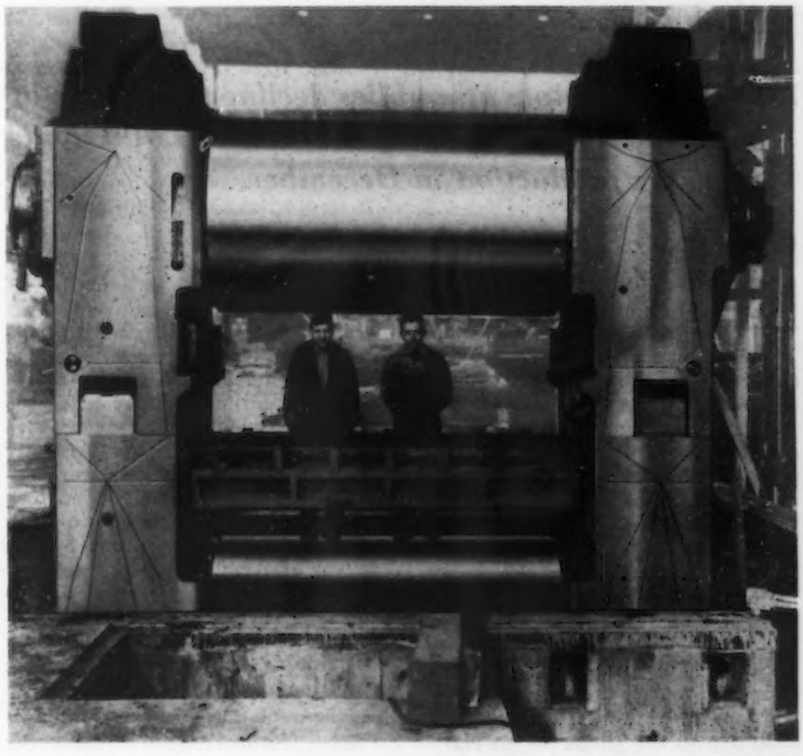
Every piece of machinery in the plant is under a crane. A 10-ton unit takes care of the slab yard and magazine feeder, while two 10-ton cranes serve the slab heating furnaces. A single 100-ton crane with runways 60 ft. above floor level takes care of the needs of the mill building, with a 15-ton unit over the mill runout tables. A 20-ton single hoist and a 20-ton double hoist crane are installed over the shear bay, while four 20-ton double hoist cranes serve the shipping building. These double hoist units, each hoist having a capacity of 10 tons, were originally developed by the Homestead engineers to serve their special needs and do so most efficiently. In the motor room a 75-ton crane is installed and a transfer car provided for moving equipment into and out of the room.

Although the operating pulpits are elevated the control rooms on the finishing end of the mill are located in the basement. Similarly the oil houses, pumps, filters, etc. are likewise in the basement. Two tunnels run the full length of the mill, one carrying oil lines and the other the high pressure and cooling water lines. Each piping system is painted a distinctive color and fully identified. Five oil systems, using 32,000 gal. of oil, are installed. One takes care of the pinions and screwdowns, another the gear drive units. The third furnishes oil to the edger, and the fourth supplies the motors. The fifth system is used for reclaiming oil that is used. De Laval lubricating equipment is used for all oil and a Trabon system takes care of those points requiring automatic grease lubrication.

Full provision has been made for possible emergencies. Where oil circulation is essential, duplicate pumps are installed so that if one should fail the other would immediately take up the load. In the event of both units failing, a sufficient quantity of oil is always available in a reservoir to assure that any material in the mill can be cleared before any equipment could possibly be damaged through lack of lubrication. To avoid the possibility of flood damage through water backing up in the sewers, provision is made to seal all outlets and sumps have been built to take care of seepage, which can easily be pumped out of the plant.

All buildings are paved with concrete, with special wood block sections along those tables and pieces of equipment where men are constantly at work. Brilliant lighting, evenly distributed, is a feature of the plant and the height of the buildings assures good ventilation in warm weather, while forced draft unit heaters maintain comfortable working conditions in all parts of the plant during cold weather.

INSTALLATION view of four-high stand showing Timken-equipped back-up rolls in position.



THIS WEEK ON THE ASSEMBLY LINE

. . . General Motors conference with United Automobile Workers Union blows up just as it was about to begin.

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. . . Controversy is right back in Governor Murphy's lap, without any present indication of a speedy settlement.

o o o

. . . Ford production hit 27,280 units last week, highest in 1937 run, as company strives to reach 7000-car day.

o o o

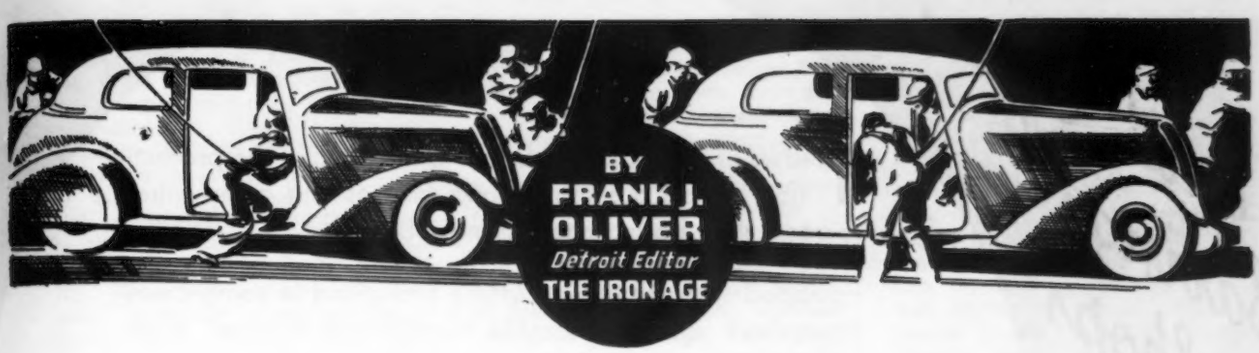
. . . General Motors assemblies decline to new low of 15,300 as compared with over 50,000 units weekly production in December.

DETROIT, Jan. 19.—Governor Murphy's efforts to arrange a truce and start negotiations between General Motors and UAW came to naught when sitdown strikers continued to occupy two Fisher Body plants in Flint through the hour when conference was to begin Monday in Detroit.

The basic point of General Motors proposal was that all strikers must withdraw from plants before bargaining would take place on matters of general corporate policy. They did not withdraw, officers of the UAW claim, because the corporation had "broken faith" in attempts to reopen the Cadillac plant and in preventing the peaceful picketing of the Guide Lamp plant at Anderson, Ind. As a matter of fact, 135 hourly and salaried workers, working on distributing and records of service parts, none on manufacturing, were asked to report at Cadillac Monday after the agreement had been made with UAW officers Saturday. Actually only 65 salaried workers were admitted to plant Monday. Fourteen policemen were assigned to duty at the Guide Lamp plant by the mayor of Anderson to prevent any possible disorder. Peaceful picketing was permitted, although strikers were warned against forcibly restraining anyone from entering the property.

The real issue is the Flint Alliance, formed spontaneously by non-organized workers in Flint. Exchange of telegrams between George Boysen, president of the alliance, and William S. Knudsen Saturday gave assurance to this group that no man's right to be represented by whomsoever he chooses will be denied and that General Motors will never tolerate domination of its employees by a small minority. Obviously this statement prejudiced the point of recognition of UAW as sole bargaining agency for all General Motors employees, although this was put on the agenda largely as basis for negotiations, it is felt. John L. Lewis's sounding off on this score did not help matters any.

To some it appears that Flint sitdowners have insisted upon sitting despite orders to evacuate by national officers of the union. Misinterpretation of the Cadillac incident gave an excuse to sit tight and charge the company with bad faith. On the other hand, the Flint Alliance is a basic issue and Homer Martin has asked the LaFollette Civil Liberties Committee to investigate the alliance's connections with General Motors and with strikebreaking detective agencies. The union claims the alliance is the tool of General Motors and that membership cards have been openly distributed by foremen and supervisors in Chevrolet and Buick plants. Boysen, a former paymaster at Buick, is named a tool of General Motors. Yet reports from Flint indicate rising resentment of the part of the unorganized group against their enforced idleness. Were it not for the presence of State militia, trouble between this faction and UAW would have broken out in red riot long ago. It appears that predominance of the un-



organized majority may eventually defeat purposes of UAW.

When the corporation and the union may be brought together over a conference table again is anyone's guess. The problem is right back in Governor Murphy's lap, where it rested a week before. His big stick is power to grant relief to strikers. Should he withhold relief, the union is practically licked, since its treasury is low and even the millions of the United Mine Workers would not go far when 100,000 men are involved.

Up to Monday the union had gained point one of its demands, which was for a national conference with top officials of General Motors on matters relating to general corporate policy. If and when the conference comes off, it remains to be seen what other concessions will necessarily have to be made by the corporation in bargaining collectively "frankly and without prejudice to anyone."

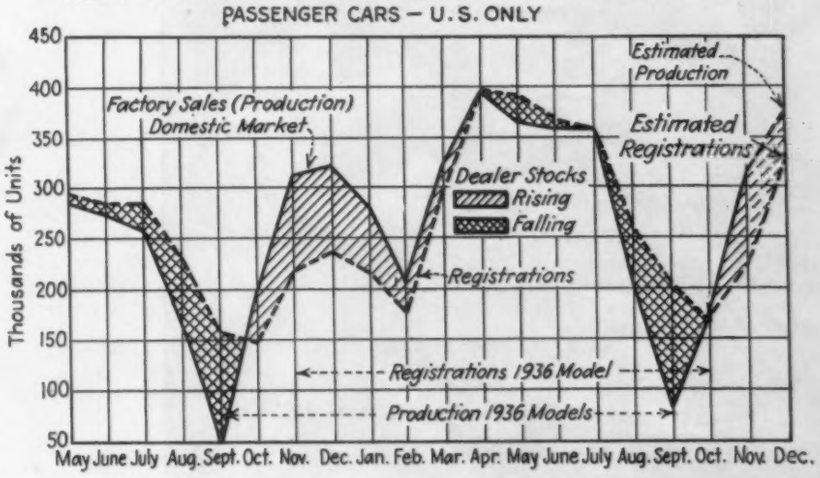
Trading on Both Sides

Naturally there will have to be some trading on both sides and it is very doubtful that the UAW will hold out for sole recognition, any statement of John L. Lewis to the contrary. William Knudsen in answering an appeal for the protection of the interests of unorganized Flint workers made it plain that General Motors will never tolerate domination of its employees by a small minority. Piece work systems have been definitely on the way out in the automobile industry for the last two years and as a matter of fact the movement for the payment of straight time on many operations began at the Buick plant in Flint. There are certain divisions such as the forge shop, where hammermen much prefer to work on a piece rate basis as they often average close to $2 an hour by this method of payment. The 30-hr. week, while it may be on the way, is not definitely here and it is very likely that a compromise will be effected on the basis of the recently established 40-hr. week.

The establishment of minimum rates is a wide-open subject and is one on which undoubtedly some concessions will have to be made. The Ford Motor Co. is practically operating today on an 80c an hr. minimum since most men hired at 75c an hr. are boosted to this level after a few months. Furthermore, in three instances in the last month where sitdown strikes have occurred in Detroit parts plants, the Ford Motor Co. has acted as intermediary and in each instance where they did so, a basis of settlement has been the adoption of a 75c an hr. minimum rate. Since wages in parts plants have been traditionally below those of the large corporation shops, it seems inevitable that General Motors will have to raise its minimum above the present 65c.

Charges of discrimination have been hurled at General Motors since the beginning of this fight, but it is fairly evident that the number of union workers discharged is very minute. One such is the man who jumped the assembly line at Kansas City, thereby breaking a company rule. The union claims the management had been "laying" for this man, as he was active in their organization. In its statement of policy governing its relations with factory employees, General Motors has been very careful to point out to its own executives that the prohibition contained in the Wagner Act

RELATION OF FACTORY SALES TO DEALERS (PRODUCTION) AND REGISTRATIONS
PASSENGER CARS — U. S. ONLY



from 4.6 *to* 200 R.P.M

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THINK of what this BULLARD Unit offers in the production of rod bushings, crown brasses and many other railroad shop boring and turning jobs.

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The unit illustrated is machining a bronze alloy worm wheel casting. Best previous mass production time was 12.01 min. New high-speed BULLARD time is 3 minutes, 41 seconds. *Over 300% increase in production.*

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against discrimination places added responsibility on the management to furnish clear evidence of the justification of the discharge of an employee in order to avoid such charges of discrimination. Not only General Motors, but practically all of the automobile companies have leaned over backwards in avoiding just this sort of thing.

Similarly, the question of seniority has been worked out in some detail and has been practically carried over "*as is*" from the rules laid down by the Automobile Labor Board set-up under the President's Settlement in 1934. What the union probably has in the back of its head is an attack on the "Class D" man whose services are essential to the operation of the plant or those who have received special training or have exceptional ability. These men are generally exempt from the usual seniority classification based simply on length of service. This principle has had acceptance for three years and it is doubtful that much ground will be given on this score.

As to regulation of the speed of production, preliminary negotiations have produced the admission on the part of Homer Martin that this is a matter that can be settled with individual plant managers according to local conditions and is not one of general corporate policy. It is a point, however, on which workers think they should be fully consulted by management.

Outcome May Write New Chapter In Industrial Relations

Not only the automotive executives, but those of all industries in the United States, look to this momentous struggle between General Motors and the UAW. The outcome is very likely to establish new definitions of collective bargaining and perhaps to rewrite a chapter in industrial relations. There is every reason to believe that both sides are anxious for a final settlement and the resumption of production, but with charges and countercharges being hurled the whole issue is up in the air. When reason is restored it is expected that Mr. Lewis will bring pressure to bear on the United Flat Glass Workers to settle their differences with the plate glass manufacturers so that a shortage of glass will not stand in the way of a rapid resumption of production. At this writing, negotiations in this direction look very hopeful.

In the meantime, the Ford Motor Co. is pushing its glass production at Rouge up to capacity and has begun to get its St. Paul glass plant into operation. The furnaces were started almost three weeks ago and additional machinery is being installed to renovate and modernize the polishing plant. Despite earlier predictions to the contrary, the Chrysler Corp. seems to be getting along quite nicely on glass that is probably being received from abroad.

Ford Output Gains

Now that strikes at important parts suppliers of Ford Motor have been settled, the company is boosting its schedules as rapidly as possible. Output is currently at 5300 units a day, up from 4800, and every effort is being made to reach the budgeted goal of 7000 units daily. According to Ward's Automotive Reports, Ford's production for the week ended Jan. 16 was 27,280 units, the highest reached in the 1937 run. Last Monday the 25 millionth Ford V-8 was turned out at the Rouge plant and the company announced that Ford sales in 1936 had again exceeded the million mark for the eleventh year. Passenger cars and trucks sold throughout the world totaled 1,219,262 units. World production in the same period was 1,194,800 units. Ford's first "1,000,000 car year" was in 1920.

Another producer that was up to peak production last week was Nash, which assembled 2250 cars for the week ended Jan. 16. Chrysler's volume declined somewhat to 26,850 units compared with 27,175 the preceding week. Total production for the week ended Jan. 16 was 85,703 passenger cars and trucks in the United States and Canada, compared with approximately 92,142 units the previous week and 99,391 in the corresponding week in 1935. Obviously this decline was represented almost entirely by General Motors total, which dropped to 15,300 units, compared with 24,030 for the week ended Jan. 9, and as compared with over 53,000 units in several weeks during December.

Passenger car sales in the United States in 1936 were greater than in any previous year in the history of the automobile industry with the exception of 1929, R. L. Polk & Company announced. Last year's total is placed at 3,367,194, as compared with 3,880,206 in 1929. The 1936 mark, however, surpasses the 2,743,908 total for 1935 by 623,286.

THESE Chevrolet men want to work, proving among other things what a well-organized minority armed with the sitdown weapon can do to the unorganized majority and a large corporation.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	December, 1936	November, 1936	December, 1935	Year, 1935	Year, 1936
Raw Materials:					
Lake ore consumption (gross tons)[a]	.....	4,269,049	3,100,530	30,857,862	*40,087,939
Coke production (net tons)[b]	.....	4,288,392	3,488,818	35,209,240	*41,708,432
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	3,115,037	2,947,365	2,106,453	21,007,802	30,618,797
Pig iron output—daily (gross tons)[c]	100,485	98,246	67,950	67,556	83,658
Castings:					
Malleable castings—production (net tons)[d]	.....	50,934	45,598	466,395	*510,022
Malleable castings—orders (net tons)[d]	.....	58,152	42,573	452,611	*509,299
Steel castings—production (net tons)[d]	.....	68,874	37,793	398,988	*722,075
Steel castings—orders (net tons)[d]	.....	76,394	40,529	400,157	*749,650
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,431,645	4,337,412	3,073,405	33,417,985	46,919,362
Steel ingot production—daily (gross tons)[e]	170,448	173,496	122,936	107,453	150,383
Steel ingot production—per cent of capacity[e]	77.66	79.05	55.53	48.54	68.52
Finished Steel:					
Trackwork shipments (net tons)[e]	5,579	4,756	3,025	42,229	68,813
Steel rail orders (gross tons)[e]	125,290	123,875	88,100	533,120	1,053,230
Sheet steel sales (net tons)[f]	.....	294,080	203,318	2,473,489	*2,383,572
Sheet steel production (net tons)[f]	.....	224,031	208,774	2,424,990	*2,367,559
Fabricated shape orders (net tons)[g]	.....	117,798	96,235	1,068,603	*1,429,348
Fabricated shape shipments (net tons)[g]	.....	128,306	76,214	1,095,216	*1,413,352
Fabricated plate orders (net tons)[d]	.....	40,519	35,584	258,315	*431,148
Reinforcing bar awards (net tons)[e]	18,550	18,740	29,025	318,340	334,790
U. S. Steel Corp. shipments (tons)[h]	1,067,365	882,643	561,515	7,371,299	10,825,132
Ohio River steel shipments (net tons)[i]	.....	127,425	61,666	926,174	*1,057,871
Fabricated Products:					
Automobile production, U. S. and Canada[k]	.....	394,890	418,317	4,119,811	*4,086,913
Construction contracts, 37 Eastern States[l]	$199,695,700	$208,204,200	$264,136,500	$1,844,544,900	$2,675,296,000
Steel barrel shipments (number)[d]	.....	733,215	541,375	6,872,452	*7,653,994
Steel furniture shipments (dollars)[d]	.....	$1,645,626	$1,558,095	$15,523,679	*$17,132,963
Steel boiler orders (sq. ft.)[d]	1,872,139	937,437	584,735	6,245,158	11,679,614
Locomotive orders (number)[m]	.....	174	2	83	*354
Freight car orders (number)[m]	.....	1,550	10,030	18,699	*40,208
Machine tool index[n]	257.7	147.1	98.3	†99.9	†180.4
Foundry equipment index[o]	.....	200.4	118.1	†119.5	†178.6
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	61,970	93,678	469,954	*614,254
Imports of pig iron (gross tons)[p]	.....	10,615	16,289	130,937	*155,486
Imports of all rolled steel (gross tons)[p]	.....	20,656	21,812	216,567	*250,626
Total iron and steel exports (gross tons)[p]	.....	203,297	239,269	3,067,336	*2,923,502
Exports of all rolled steel (gross tons)[p]	.....	123,159	85,590	897,749	*1,046,035
Exports of finished steel (gross tons)[p]	.....	100,344	78,625	767,456	*927,800
Exports of scrap (gross tons)[p]	.....	59,113	142,135	2,047,290	*1,778,685
British Production:					
British pig iron production (gross tons)[r]	671,400	643,100	559,300	6,426,000	7,681,600
British steel ingot production (gross tons)[r]	1,019,200	1,001,300	811,500	9,842,400	11,699,000
Non-Ferrous Metals:					
Lead production (net tons)[s]	.....	43,625	42,020	421,764	*415,896
Lead shipments (net tons)[s]	.....	50,153	42,333	433,456	*451,169
Zinc production (net tons)[t]	47,050	45,742	40,550	431,499	524,271
Zinc shipments (net tons)[t]	59,821	57,107	42,058	465,746	563,273
Deliveries of tin (gross tons)[v]	6,930	5,345	5,360	59,110	74,005

*Eleven months' total. †Three months' average.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

Weekly Index of Rate of Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week	93.3	Same week 1933	38.8
Preceding week	95.0	Same week 1932	47.3
Same week last month	100.1	Same week 1931	71.7
Same week 1936	81.6	Same week 1930	95.4
Same week 1935	62.8	Same week 1929	129.7
Same week 1934	50.7		

THERE was a further decline in activity in the capital goods producing industries last week, according to evidence supplied by THE IRON AGE's regular weekly barometer of these operations. The general index receded 1.7 points to 93.3 per cent of average, against 95.0 per cent during the preceding week and 100.2 per cent for the opening week this year. The recession, which occurred after adjustment of the index's components for seasonal variation, was partly attributable to these adjustments, but also reflected decreased automotive output caused by the strike. Other series of the index, such as the separate steel production index, showed declines only after seasonal adjustment. Actual operations either were sustained or increased slightly, but increased less than ordinarily at this season because of continued near-capacity production for some time.

The week's general index number of 93.3 per cent of the 1925-27 average compares with a figure of 81.6 per cent for the third week in 1936 and 62.8 for the corresponding period of 1935. This was a gain respectively of about 14½ and 48½ per cent.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Welding Course For New Yorkers

A SPECIAL course in arc welding design and practice for engineers, designers, architects, welding supervisors, operators and others in and around New York is being offered by the Lincoln Electric Co., Cleveland.

Meetings will be held at the Port of Authority Building, Eighth Avenue and Fifteenth Street, from Feb. 1-5, under the direction of E. W. P. Smith, consulting engineer of the Lincoln company. Day and evening sessions will be held. Mornings will be devoted to free consultation service on welding problems, and afternoons to practical welding demonstrations. Evening sessions will consist of illustrated lectures and open discussions. Both practical and theoretical aspects of arc welding will be covered.

A small fee will be charged for the full course. The complete prospectus is obtainable from the New York office, 330 West Forty-second Street, or from the company's welding engineering department at Cleveland.

WASHINGTON. . . . . .

. . . In Carnegie-Illinois labor hearing witness admits he served as employee representative and worker for CIO at the same time.

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. . . Hearings adjourned until next week; Supreme Court sets Feb. 8 as date for arguments on National Labor Relations Act.

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By L. W. MOFFETT
Resident Washington Editor, The Iron Age

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WASHINGTON, Jan. 19—Admittedly serving in the dual capacity of an employee representative and a salaried Steel Workers' Organizing Committee organizer, Elmer J. Maloy, crane stripper operator at the Duquesne, Pa., works of the Carnegie-Illinois Steel Corp., occupied the witness stand most of the time last week at National Labor Relations Board hearings on John L. Lewis' Committee for Industrial Organization-inspired complaint against the company.

Under cross-examination by William Beye, Carnegie-Illinois attorney, Maloy, ousted chairman of the Pittsburgh employee district committee, revealed that while he was agitating among workers to join the SWOC, he was also, as chairman of the rules committee of the employee representation plan, at the Duquesne works, picking up money from the company through what Mr. Beye called the "genial cooperation between the management and the (employee) delegates."

Maloy said that not only were representatives paid the same wages while attending committee meetings as though they were actually at work, but that when meetings ran overtime they tried to collect $1.50 for the extra time. They were not always successful, he said. The extra time, Maloy stated, was paid for attending meetings when employees were not at work. He also testified exhaustively as to methods used in transporting workers by automobile for the purpose of voting in employee elections. The mileage of the car drivers was checked, at times by Maloy and in other instances by other representatives of the rules committee. Maloy said that the general practice of employee representatives was to "give a man sufficient mileage for a start to pay for his gasoline," referring to 1935 and 1936 elections. Asked if this practice was known to the company, Maloy replied that some of the management must have known, because one management representative "asked me how I thought anybody could run 313 miles in one day in town." When asked his opinion as to sufficient mileage to make it pay a car driver, Maloy said that 200 miles or better would be a fair amount of mileage for "fairly active" drivers and "if he were inactive, about 150 miles would be a fair basis."

Hearings Adjourned for Inauguration

The hearings were adjourned last Friday until next Monday because of inaugural ceremonies in Washington this week, the highlight of which will be the reinauguration of President Roosevelt tomorrow. The hearings give promise of being so prolonged that it is conceivable that before all the witnesses have been heard and arguments presented the Supreme Court will have handed down a decision on the constitutionality of the National Labor Relations Act, arguments on which will begin before the Supreme Court on Feb. 8. This is the date set for arguments on the Jones & Laughlin Steel Corp. case. Other cases to test the constitutionality of the act also are pending before the Supreme Court. In the event the court should hold the act to be unconstitutional, obviously cases before the National Labor Relations Board would automatically be canceled.

In addition to the SWOC witnesses it has already heard since beginning hearings in December, the board proposes to call 10 others and also to recall some who have already testified. These witnesses will be subject to cross-examination by counsel for the company. The company then will call its own witnesses, who will be subject to cross-examination by board attorneys. Further extension of the hearings will result from joint intervention in the case by Attorney Alex Pendleton of Gary, Ind., and Attorney Benjamin Wham of Chicago. They will appear for certain workers in the Chicago-Gary district plants of the Carnegie-Illinois Steel Corp., who say they want to preserve the framework of the employee representation plan. These intervening attorneys have been given permission to file an answer to the NLRB complaint and to present limited evidence as well as to make arguments.

While the NLRB is proceeding in the Carnegie-Illinois case, the Senate Committee on Civil Liberties, headed by Senator LaFollette of Wisconsin, has begun hearings as to alleged espionage on and use of armed force against workers in connection with labor troubles. This inquiry, also largely inspired by Lewis' CIO as an attempt to strengthen his unionization drive, is directed particularly against industries which Lewis is endeavoring to penetrate, including steel. Subpoenas have been issued by the committee calling for tes-

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timony and records of steel executives of different companies. The hearings were begun last Thursday when representatives of the Tennessee Coal, Iron & Railroad Co., Birmingham, appeared before the committee and refuted charges made against the company.

Borden Burr, counsel for the company, told the committee that the company was compelled to hire special protection owing to failure of law enforcement in the Birmingham district, and that the only occasion on which the company brought in strikebreakers was in 1934, during disputes at the coal mines, in which communists are said to have been most active. Though pointing out that employment records are a private matter, it was agreed to supply them to the committee. They do not, the committee was told, show interference with collective bargaining. Vice-President Karl L. Landgrebe, of the company, denied that it had employed any detectives to investigate labor organizing activities or had paid extra to any employees for such work. Ernest D. LeMay, assistant to the president, said that the company never hired Pinkerton detectives.

Hearings before the LaFollette committee will be reopened Thursday when testimony will be received from members of the National Metal Trades Association. Included in witnesses to be called are Homer D. Sayre, Chicago; commissioner of the association; O. R. Abbott, Chicago, employment manager; L. A. Stringham, Eastern representative, and W. J. Smith Duverdier, Cleveland, special representative.

Increased pressure of official business before the busy Labor Board caused it to withdraw from the hearings and to place them in charge of Examiner Charles A. Wood, while L. Pressman has entered the proceedings as attorney for the SWOC and the Amalgamated Association of Iron, Steel and Tin Workers, both of which are CIO affiliates.

Maloy Says He Was Paid to Attend Meetings

In testifying as to payment to representatives for attending committee meetings while members of the committee were not at work, Maloy said that if the general body meeting or other committee meetings last over an hour and a half, "somebody would adjourn the meeting to the next day, so that we could have another meeting the following day and we would get the $1.50 next day." This statement was made under cross-examination after Maloy had testified that "most of the representatives considered that the plan was really the company's plan, that they were willing to pay for it * * * * and we might as well obtain all that we could." In reply to a question by Mr. Beye, the witness stated that he would say that he had received $105 a month at least five times in the course of a year and a half for pay for employee representative activities.

"How else could you pick up money?" inquired Attorney Beye.

"Attending the Pittsburgh district council meetings, when we were paid our regular hourly rate for 8-hr. for each day," said Maloy. "We also received expense money, approximately $2.50 a day, in addition to our regular hourly rate for the 8-hr. turn. Then if we desired we could go to work on our regular shift in the mill if we were on night turn."

While Examiner Wood curtly ruled out a question by Attorney Beye concerning the American Federation of Labor-CIO rift and Maloy's CIO connection while also serving as an employee representative, the matter found short reference in the record.

Mr. Beye had asked Maloy if, as in practically all other matters, there were differences of opinion in the Pittsburgh district council procedure.

Given an affirmative answer, Mr. Beye asked:

"You have got that proposition presented right now to you, have you not, in the CIO and Steel Workers' Organization Committee and their conflict with the American Federation of Labor, on a broad issue?"

When Examiner Wood said he was not sure that the question was strictly relevant—he later ruled it out—Mr. Beye said he thought it "very relevant," because Maloy had testified that he is president of a CIO organization.

"The evidence which he has presented in the form of these very matters to which reference has been made contains resolutions which refer to that precise thing," said Mr. Beye, "upon the removal of Mr. Maloy as chairman of the Pittsburgh district council, because in the opinion of over two-thirds of delegates in that district, they did

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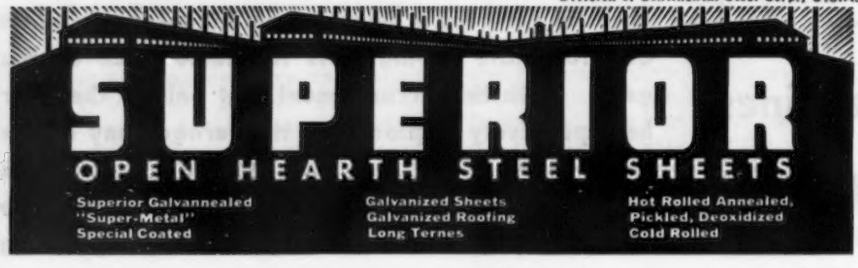


not believe that Mr. Maloy, having a difference of views with respect to the plan of employee representation and his CIO affiliation, could properly continue as the head of the plan group and honestly and faithfully represent the office which he was then seeking to hold."

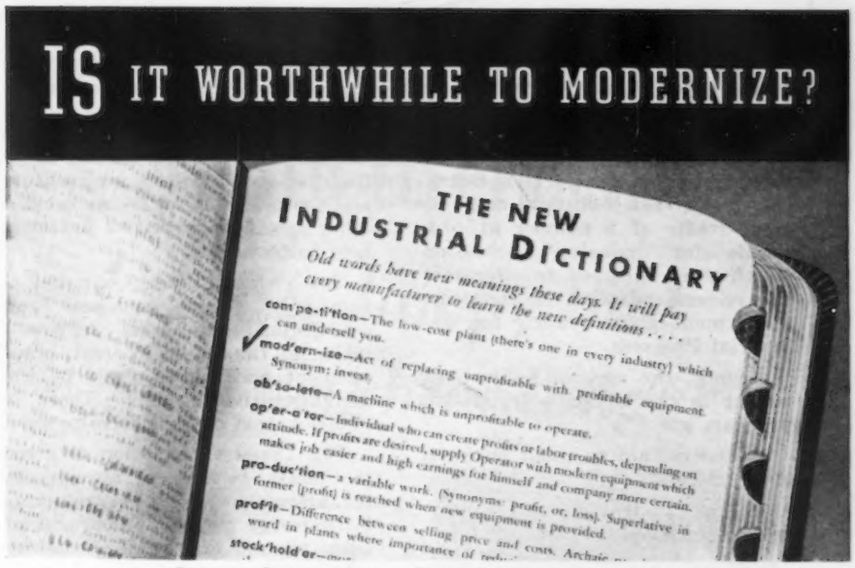
Walsh-Healey Act To Be Tightened

WASHINGTON, Jan. 19.—Further tightening of the Walsh-Healey Government Contracts Act has been decided upon by Secretary of Labor Perkins. Already the sources of obstruction to Government departments in purchasing supplies because of rigid enforcement of its provisions at the direction of the Contracts Board, Miss Perkins said she will advocate and Senator David I. Walsh of Massachusetts will introduce an amendment reducing from $10,000 to $2,000 the amount of contracts which will be exempted from provisions of the law. Presenting figures showing that 550 contracts, involving $27,500,000, had been awarded under the law during the three-month period ended Dec. 28, Miss Perkins said that this sum was only about 50 per cent of the aggregate amount of Government contracts awarded during that time. It plainly showed that there has been widespread refusal of suppliers to bid under the terms of the act.

Refusal of copper manufacturers to bid on Navy Department requirements caused the department to turn to the emergency provision of the law and make the purchases without regarding its labor and hours provisions. It is believed this precedent will be followed by the Navy and other departments in purchasing emergency supplies.

Miss Perkins insists that there should be a much lower exemption minimum in order to make the act more effective, though the question of such exemption apparently has not been much of a figure so far in refusal of suppliers to bid. Miss Perkins also predicted that the act likely will raise the prevailing wage level in several areas. This also is not a question at issue so far as the important industries of the country are concerned in refusing to bid under the act.

The German Official Gazette has published an order restricting the production of tubes of steel and its alloys and prohibiting the production of steel tubes other than those which they were turning out before July 1, 1933.


IS IT WORTHWHILE TO MODERNIZE?
THE NEW INDUSTRIAL DICTIONARY
Old words have new meanings these days. It will pay every manufacturer to learn the new definitions . . . .
com·pe·ti'tion—The low-cost plant (there's one in every industry) which can undersell you.
mod'ern-ize—Act of replacing unprofitable with profitable equipment. Synonym: invest.
ob'so-lete—A machine which is unprofitable to operate.
op'er-a'tor—Individual who can create profits or labor troubles, depending on attitude. If profits are desired, supply Operator with modern equipment which makes job easier and high earnings for himself and company more certain.
pro-duc'tion—a variable work. (Synonyms: profit, or, loss). Superlative in former (profit) is reached when new equipment is provided.
profit—Difference between selling price and costs. Archaic
stock'hold er—

mod'ern-ize—Act of replacing unprofitable with profitable equipment.*

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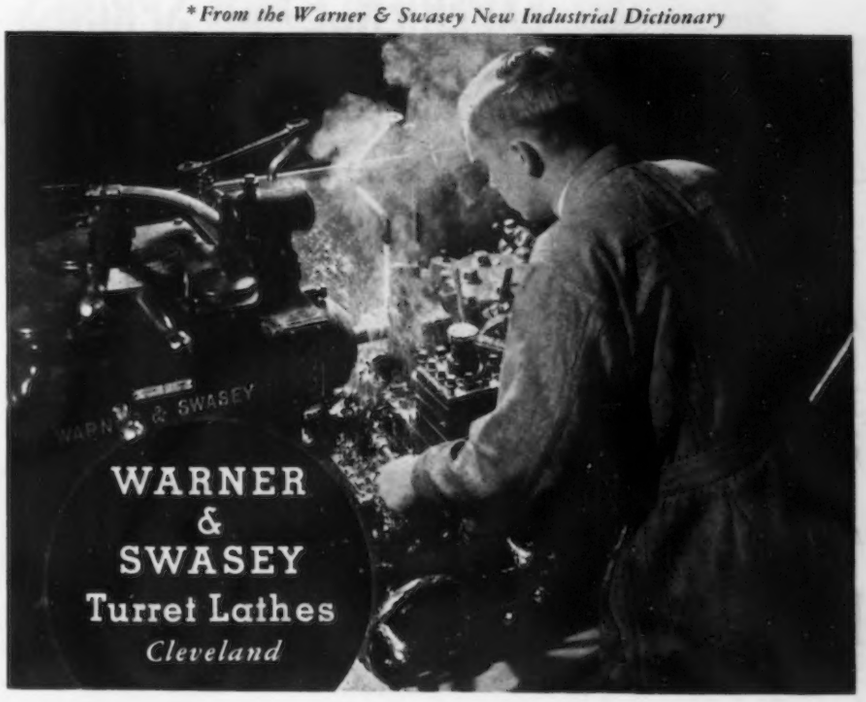
** From the Warner & Swasey New Industrial Dictionary*



Industry Legislation Proposed by Berry

WASHINGTON, Jan. 19.—President Roosevelt has received from Major George L. Berry, coordinator for industrial cooperation, drafts of a number of proposals for industry legislation which were designed to effectuate the recommendations of the joint mangement-labor Council for Industrial Progress.

Among the several objectives sought in the council's legislative program are:

1. Federal aid to small business enterprises.

2. A permanent economic advisory commission.

3. Establishment by law of maximum hours of work and minimum wages in industry; abolition of child labor; and prevention of unfair methods of competition.

One of the bills submitted proposes Federal insurance of loans to small enterprises made by banks and other private lending institutions. A second measure seeks to establish a Federal economic advisory commission to aid in the stabilization of employment in industry, agriculture, and commerce, and make comprehensive and continuing study of the national income, to prevent industrial stagnation and a recurrence of depression conditions.

The proposed legislation on hours, wages, child labor and competitive practices is premised upon the fact, to be established by legislative finding, that sweated labor and employment of children in industry constitute unfair methods of competition in commerce, as is the case now recognized by statute and the courts as regarding certain other specific competitive practices held to be unfair.

The Federal Trade Commission, enlarged to nine members and constituted with equal representation of the public interest, management and labor, would be the administrative agency. There is no delegation of legislative powers.

The Trade Commission is given the power to approve agreements for affirmative, cooperative action by industry groups. Approval of such agreements by the commission would exempt the parties from the penalties under the anti-trust laws until the commission's approval is withdrawn, or the agreement is modified or revoked by the court.

Any person could apply to the commission for exemption from the provisions of the act on the ground that his business operations were interstate. The drafts of bills were not considered as final by Coordinator Berry, but as constituting "a basis for further discussion."

No bill was submitted from the council on the subject of a census of employment, although committee recommendations were unanimously adopted in the meeting Dec. 11, that a complete national census of employment status every five years should be authorized, supplemented by periodic checks to give a running inventory of employment and unemployment.

The committee report also emphasized the vital necessity of arriving at standard definitions of terms in connection with the subject of employment. It was indicated the Industry Council will support any measure in Congress which seeks to realize these objectives.

Industry to Aid in Reciprocal Treaties

WASHINGTON, Jan. 19.—While the administration's purpose to extend the life of the Reciprocal Tariff Act was virtually assured of accomplishment, it will be facilitated by the decision of the State Department to grant greater voice to industry in the way of presenting suggestions as to products to be affected by trade agreements. This important announcement was made in connection with negotiations soon to be taken up looking to a trade agreement with Ecuador. Heretofore an outstanding objection to the agreements was the procedure by which they were reached. Industry was given limited opportunity and time to be heard by the Committee for Reciprocity Information and, though it felt it was handicapped in this direction, it was at a particular disadvantage because it was not told what products the State Department had in mind as to possible changes in duties.

Under the new policy sufficient time will be given industry to make suggestions as to contemplated agreements and more important, the State Department's departure in policy provides for publication of products imported on which it is proposed to reduce or bind rates when formal notice is given of plans to negotiate a trade agreement. By indicating to the State Department the effect of proposed concessions, the department obviously will be in a better position to determine the list of products which finally are to be considered and industry will be better protected against unfavorable action. The State Department also, if it gives the proper weight to the suggestions, will escape the former charge of "railroading" the agreements without giving industry a satisfactory hearing and adequate time to present its case. Much effort and time will be saved in preparing briefs and making oral presentation on products which will not be considered.

The State Department has an-

nounced that interested parties have been given until Feb. 4 to file with the Committee for Reciprocity Information, Seventh and F Streets, N. W., Washington, presentations regarding the proposed Ecuadorian treaty.

Circumstances warranting, the committee, either upon request or upon its own initiative, will arrange for special oral presentations to the full committee or to subcommittees. When it is thought necessary, the attendance of technical experts at informal conferences may be arranged. Details of subjects it is desired to discuss should be outlined in making requests of the committee for oral presentation. The committee has stated that while consideration will be given to all statements, the presentation of factual matter in writing should be under oath and six copies should be provided.

The presentations, it has been announced, will be given careful consideration, analyzed, summarized and distributed, with comment by the committee to all interested branches of the interdepartmental agreements. The committee will consider as confidential all information presented to it, except statements made in open hearings.

American iron and steel and machinery exports to Ecuador are small.

Hearings on the administration resolution for a three-year extension of reciprocal tariff powers will begin Thursday before the House Committee on Ways and Means. Despite Republican protest, led by Representative Treadway of Massachusetts, the hearings will be brief and it is likely the measure will be taken quickly to the floor of the House and passed. The Republican minority opposition in the Senate to extension of trade agreements also is expected to be easily and swiftly bowled over. Representative Treadway, ranking Republican member of the Ways and Means Committee, said he will move for Senate ratification of all agreements such as is necessary with respect to treaties. This move also undoubtedly will fail. Unless extended the act would expire in June.

Allotments totaling 18,609 gross tons of tin plate scrap have been assigned to 39 producers of that commodity for export, subject to license, during the calendar year 1937, in accordance with the provisions of the statement of procedure announced by the acting secretary of state on Dec. 7. Applications for allotments totaling 27,752 gross tons were received, some of which were reduced to comply with the requirements set forth in the announcement of Dec. 7.

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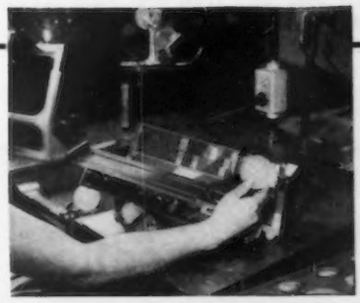

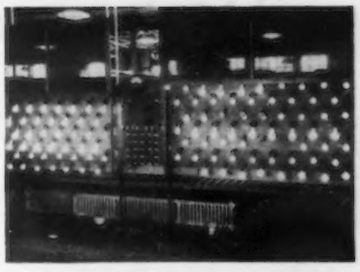

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IJ-21

Freight Rate Hearing Postponed to Jan. 26

WASHINGTON, Jan. 19.—When the Interstate Commerce Commission resumes hearings Jan. 26 on the petition of railroads for an upward revision of the basic freight rate structure it will receive testimony from the carriers on proposed increases in rates on iron and steel and scrap. The hearings were adjourned last Friday on account of inaugural ceremonies in Washington this week. Testimony so far taken related to proposed increased rates on coal and iron ore with strong opposition prevailing against higher coal rates and considerable opposition to increased ore rates. The commission has deferred action on the suggestion of the carriers that it hand down decisions on proposed increased rates as to each group of products following submission of testimony concerning them. Shippers have strongly opposed the suggestion.

Engineers Endorse Public Works Plan

WASHINGTON, Jan. 19.—Closing a three-day session in Washington last Saturday, the annual meeting of the American Engineering Council adopted resolutions endorsing President Roosevelt's recommendation to create a Department of Public Works. It also endorsed the President's recommendation for a merit system made in connection with his Government reorganization plan. The American Engineering Council long has urged the setting up of a Department of Public Works as an additional cabinet post. Headed by A. A. Potter of Purdue University as president, the council reelected all of its officers. Frederick M. Feiker, Washington, was continued as secretary and Charles E. Stephens as treasurer.

To Ask More Money For Floating Drydock

WASHINGTON, Jan. 19.—Secretary of the Navy Swanson last Thursday indicated that he will ask Congress for an additional appropriation of $2,000,000 for the construction of the huge floating drydock for Pearl Harbor in a West Coast navy yard. The Secrtary said that the Navy Department is convinced it cannot be built for the $10,000,000 appropriated by the previous Congress and that it will cost about $12,000,000. The bid of the Bethlehem Steel Co., and estimates of navy yards for construction of the drydock were rejected some time ago because they exceeded the appropriation.

Refrigerated Trucks a New G-E Line

A NEW line of five refrigerated truck bodies, including automatic, holdover, and dry ice types, has been announced by the General Electric Co., Schenectady, N. Y. Constructed of cold-rolled sheet steel, interior insulation is secured by using glass wool on the roof and floor and Thermocraft on the side walls. Inner linings are made of galvanized sheets. In the automatic types, power to drive the refrigerating unit is obtained from the truck motor by means of a power-take-off device and a General Electric electromagnetic clutch. Cooling in the holdover types is provided either by a refrigerator unit mounted in the skirt compartment or by connecting to the ammonia system at the main plant. The dry-ice type can be charged from inside the body and cooling is distributed by a special aluminum plate.

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The "LITTLE LANDIS" has no equal for efficient, economical service in threading *pipe* and *bolts* for jobbing or maintenance work. This new LANDIS machine has a built-in gear box to insure efficient operation on all diameters. It employs the patented LANDIS Chaser whose free-cutting action and long life keep tool costs to the minimum.

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Alloys in Casting Symposium Subject

THE use of alloys in castings was the subject of a symposium held by the Northeastern Ohio Chapter of the American Foundrymen's Association at the Cleveland Club, Cleveland, Jan. 14. Much information of value to foundrymen regarding the effect of alloys in improving the various properties in castings was presented by five speakers affiliated with companies producing alloys. These talks were illustrated with lantern slides. While stressing the benefits resulting from the addition of alloys in making castings, all agreed that the use of alloys is not a cure-all for foundry problems.

Vanadium has not been used long in cast iron and much is still being found out about it, said R. J. McElwee, Vanadium Co. of America. Until recently there has been some misleading information as to what vanadium will do to cast iron. It is not necessarily true that vanadium will harden the iron. While vanadium gives cast iron heat and wear-resisting qualities, its most important advantage is in the general improvement it produces in the physical properties of the metal in castings made in a wide range of sizes. With its use, physical properties are easier to control, as the metal is less sensitive to the cooling rate in the mold. The addition of the vanadium must be made after the metal is completely oxidized.

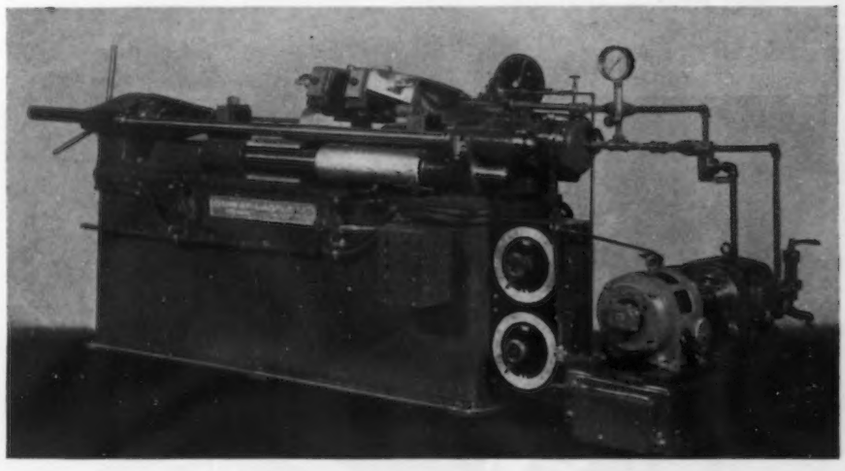
Nickel is a graphitizer and hardening element when used in iron and has other good qualities, said Fred J. Walls, International Nickel Co., Inc. Its greatest efficiency is in combination with other alloys that are carbide forming elements. Combined with other elements it permits quenching at greatly reduced speed. Its use in the manufacture of crankshafts and in various other fields is developing very fast, said Mr. Walls.

Chromium must be used with considerable discretion and as in the case of other alloys must be used for specific purposes, commented E. K. Smith, Electrometallurgical Corp. He favored making special iron for special purposes by adding chromium in the ladle. Foundrymen formerly were afraid to add the chromium in the ladle or spout, he said, but it now has become a common practice. It is added in the cupola in briquettes or other form. It is used to a considerable extent as a control medium to secure a high chill. Chromium, continued Mr. Smith, increases strength and one of its important and very general uses is for resistance to wear. It also provides corrosion resistance qualities. One of its coming uses is for heat resistance. Because it stabilizes carbides, he predicted a large use of chromium in making heat-resisting castings.

A new type of high chrome casting is being used for abrasion resistance. Iron containing 1 per cent of chromium combined with nickel or high silicon is now being used for heat resistance. Castings with 24 per cent or more of chromium, he said, are now coming into use. It is important in using chromium, he pointed out, to use it in proper proportion with other elements.

Molybdenum is most effective for improving the tensile strength of castings, stated V. A. Crosby, Climax Molybdenum Corp. of America. It also improves the structure of the iron, its machineability, resistance to fatigue and heat treating qualities.

Titanium is one of the newer elements in the alloy field for cast



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Husky Thomson-Gibb Welders like this are expensive but the way they turn out more and better work at low cost makes them a mighty profitable investment. May we prove how much more *you* could get out of a Thomson-Gibb machine?

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iron as was pointed out by E. R. Starkweather, Titanium Alloy Mfg. Co. This element, he said, is generally thought of as a deoxidizer and cleanser. However, it also increases the physical properties and machineability and tends to make the metal close grained. It may be used to equal advantage in a cupola or an electric furnace.

Ferrotungsten has been produced successfully from Chosen ore at the Kashiwazaki works of the Institute of Physical and Chemical Research in Japan, according to the press there. Monthly output is expected to reach 20 to 30 metric tons, the metal to be used principally for the production of high speed tools.

Navy Department to Call Conference On Walsh-Healey Act

WASHINGTON, Jan. 19.—While Secretary of Labor Frances Perkins is preparing to tighten provisions of the Walsh-Healey Government Contracts Act, Assistant Secretary of the Navy Charles Edison, newly installed, is preparing to call conferences of manufacturers and labor leaders to solve problems of getting supplies for the Navy under the terms of the new law. Announcement to this effect was made Monday by Mr. Edison shortly after being inducted into office.

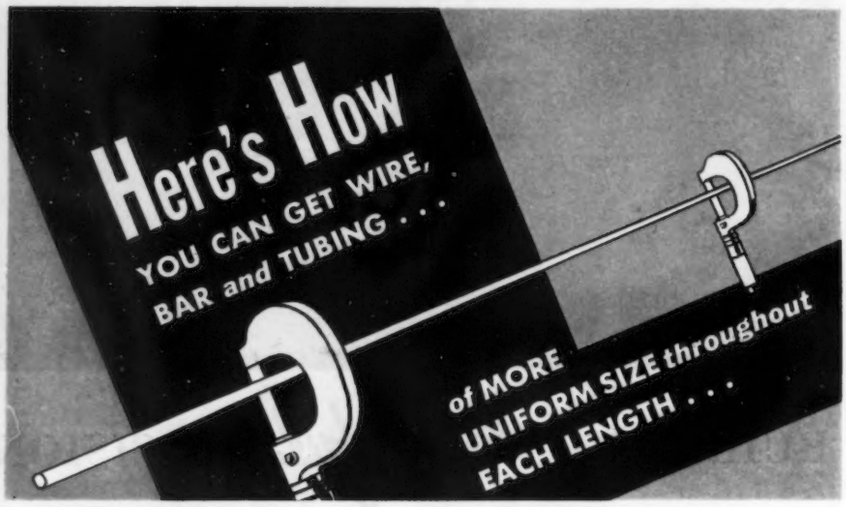
Mr. Edison said that these problems, centering around wage and hour provisions of the act, must be solved immediately or it may become necessary to lay off hundreds of navy yard workmen. His statement indicated growing conflict between large purchasing departments of the Government with the Department of Labor. The latter administers the law under a Government Contracts Board and its rigid regulations requiring strict adherence to the act have resulted in holding up large tonnages of steel for the Navy building program, together with other supplies for the Navy and other departments, particularly the War Department.

So pressing were Navy Department needs for copper supplies that recently it made purchases in the open market under an emergency provision which permits their acquirement without calling for bids. The refusal of steel makers to bid under the terms of the act has not been due to the matter of wages or hours but rather to Department of Labor rulings which prohibit flexibility in hours which are so necessary to continuous process industries and also to requirements as to the keeping of exhaustive records.

Meanwhile Miss Perkins has announced her purpose to reduce from $10,000 to $2,000 the quantities of supplies which may be purchased under a Government contract without respect to terms of the law. She said that Senator Walsh of Massachusetts, one of the sponsors of the law, will introduce the amendment in the Senate.

Largest All-Welded Ships Being Built

A NEW tanker, to be built for the Atlantic Refining Co. in Chester, Pa., shipyard of the Sun Shipbuilding Co., will be the world's largest welded ship, the Atlantic Refining Co. has announced. With a deadweight of 18,500 tons, the new oil carrier will also be the largest commercial vessel under construction in American shipyards. The new tanker will have a length of 521 ft. between perpendiculars, a beam of 70 ft. and a cargo capacity of 156,000 bulk bbl. of gasoline. Preliminary construction work has already been started.



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British Plants to Add Coke Ovens

LONDON (Special Correspondence)—The extremely busy state of the British iron and steel trades has caused the owners of iron and steel works in North Lincolnshire to embark upon several projects of development and improvement, some of which are to be carried out early in 1937.

One obstacle to progress which it is hoped will be removed is the scarcity of coke. Many plans for coke oven extension are being carried out in the South Yorkshire coalfield, and to some extent the iron and steel works of North Lincolnshire depend upon South Yorkshire supplies of blast furnace coke. The Appleby-Frodingham steel works, now part of the United Steel Companies combine, gets its coke mainly from the Rothervale (South Yorkshire) branch of the combine, but it is now intended to erect a modern coking plant with by-product recovery works at the Appleby-Frodingham steel works, and a site is being cleared for the purpose.

Berry Asphalt Co., Waterloo, Ark., plans 8-in. welded steel pipe line from oil field near Troy, Nevada County, Ark., to refinery at first noted place for crude oil transmission.

Gas Transportation of Michigan, Mount Pleasant, Mich., affiliated with Gas Corp. of Michigan, same place, plans 4-in. welded steel pipe line from gas field in Winfield Township, Montcalm County, to Greenville and Belding, Mich., for distribution at latter points. A steel pipe gathering system will be installed in area noted.

Humble Oil & Refining Co., Humble Building, Houston, Tex., has let contract to Apex Construction Co., Second National Bank Building, for 10-in. welded steel pipe line from Tomball gas field, Harris County, Tex., to Houston, with 10-in. radiating lines to Baytown, Beaumont, Port Arthur and Port Neches, Tex., about 120 miles, for service at points noted; also for steel pipe line gathering system in gas field district. Award for about 12,000 tons of pipe was let recently to National Tube Co. Line will be provided with compressor stations at different points for booster service. It will be built under supervision of Humble Pipe Line Co., an affiliated organization. Cost about $2,000,000.

Godfrey L. Cabot, Inc., Charleston, W. Va., operating natural gas properties for carbon black production, etc., plans welded steel pipe lines from gas field to Beaver, Raleigh, West Raleigh, Daniels and neighboring communities in Raleigh County, and to Avis and Hinton, Summers County, for distribution. Project will be carried out by Wak Co., Inc., a subsidiary. Main offices of parent organization are at 77 Franklin Street, Boston.

Water District No. 49, King County, Seattle, has let contract to Pacific Waterworks Supply Co., Seattle, for 107,360 ft. of wrapped steel pipe and 400 ft. of galvanized wrought steel pipe for water system, at $73,135. Parker & Hill, Smith Tower, Seattle, are consulting engineers.

Havre, Mont., closed bids Jan. 14 for steel pipe line system for natural gas distribution, covering radius of 15 miles. Fund of $165,000 has been arranged for project. William White is city clerk.

Simrall Pipe Line Corp., West Branch, Ogemaw County, Mich., has authorized new welded steel pipe line from oil field, Clayton Township, Arenac County, to connection with pipe line system at West Branch, about 12 miles.

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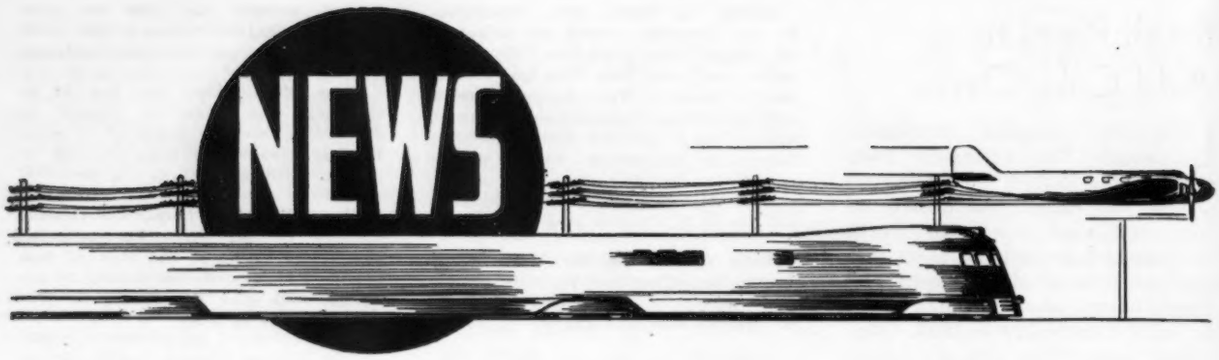

U. S. Steel to Spend $60,000,000 At Clairton and Edgar Thomson Plants, Including Strip Mill and Slabbing Mill

THE UNITED STATES STEEL CORP. will make a further large expenditure, estimated at $60,000,000, for modernization of mills and new construction in the Pittsburgh district, it was announced by William A. Irvin, president, at a dinner Friday evening, Jan. 15, at the William Penn Hotel, Pittsburgh, which was attended by about 600 business leaders and representatives of the press. The dinner followed the formal opening of the new Carnegie-Illinois 100-in. semi-continuous plate mill at Homestead, Pa., a technical description of which appears elsewhere in this issue.

Included in the new program is construction of an 80-in. continuous hot strip mill with a cold reduction unit at the Clairton, Pa., works, and a new slabbing mill at the Edgar Thomson works, together with considerable electrification work at the latter plant and transmission lines to Clairton, where much of the new power will be consumed. The slabbing mill, which will be required primarily to supply slabs to the new strip mill at Clairton, will have an annual capacity of 1,000,000 tons. The annual capacity of the new strip mill will be 600,000 tons. The mills probably will be ready for operation in the late spring or early summer of 1938.

The bulk of the new work will be done at Clairton, it being estimated that $45,000,000 will be expended there and $15,000,000 at Edgar Thomson works. About 80 acres of land will be utilized at Clairton in the projected new construction, but eventually 147 acres will be so used. No additional acreage will be required at Edgar Thomson. The new mills at Clairton will give the corporation modern sheet and tin plate facilities such as now exist in the Chicago district. Present capacity at Clairton consists of by-product coke plant, blast furnaces, steel works and mills for rolling structural shapes and bars. There are certain "operating complications," the corporation's announcement states in the changes to be made, but despite these the present Clairton facilities will either be retained as they are or transferred to other plants of the Carnegie-Illinois Steel Corp. on the Monongahela River.

The formal opening of the new Homestead plate mill was attended

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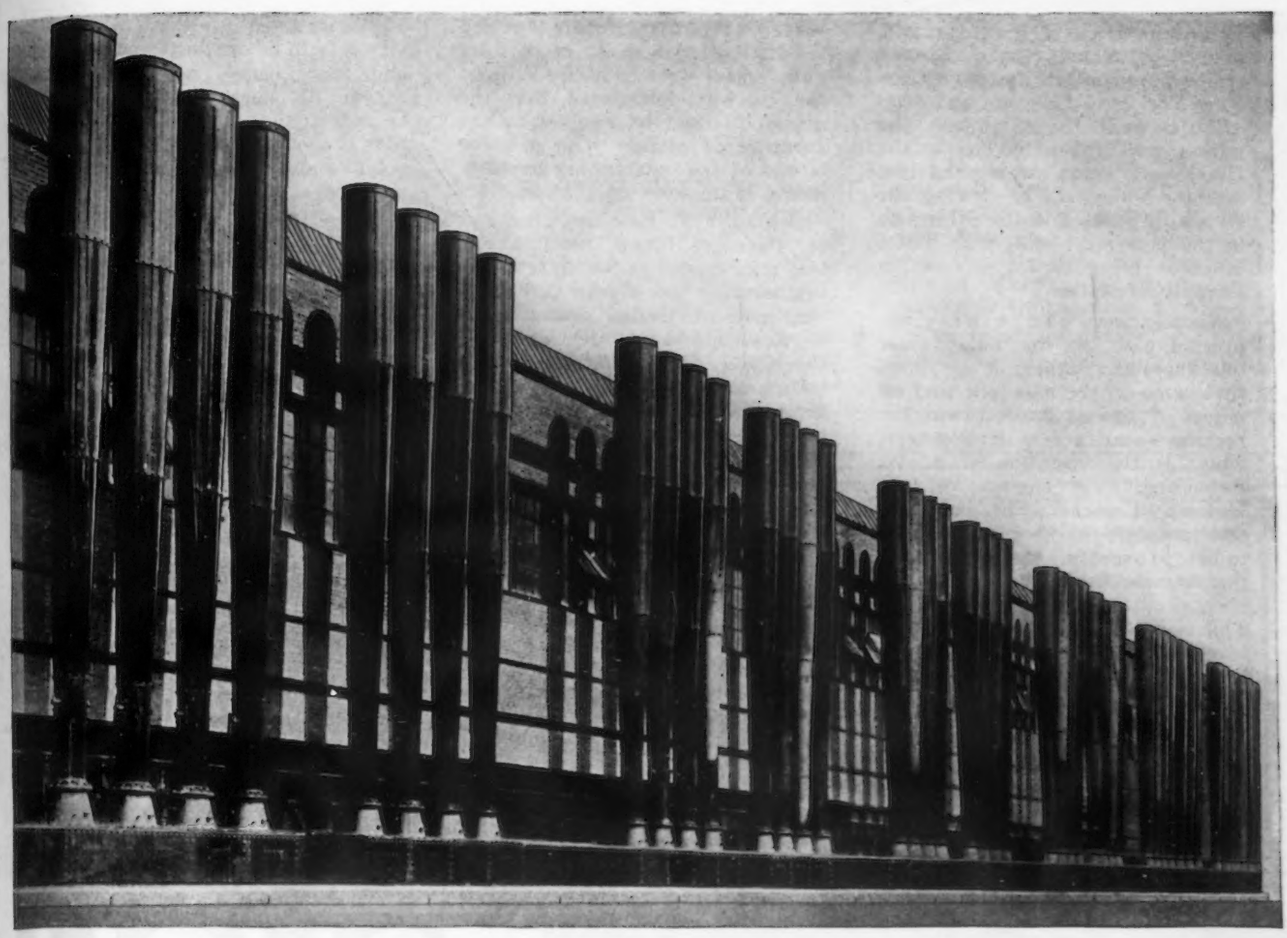

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Pit furnace capacity and proper heating of ingots will grow in importance as new large mills become really busy. The soaking pit is often the bottle neck which determines the speed and uniformity of operation—and profits—of an entire mill.

Furnaces arranged for and operated by the Isley System have proved to be the most satisfactory units for the heating of steel; for high fuel economy; and for greatest flexibility to suit the most variable schedule. They are unbeatable where cold blast furnace gas is the only fuel available.

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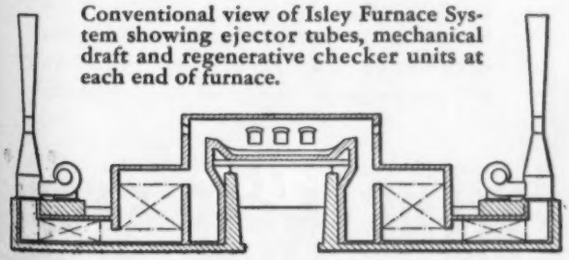

Conventional view of Isley Furnace System showing ejector tubes, mechanical draft and regenerative checker units at each end of furnace.

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ISLEY *Furnace* MORGAN WORCESTER ENGINEERS AND MANUFACTURERS *System*

by a large group of invited guests, many from distant points. Special trains were run to Pittsburgh from New York and Chicago, and soon after arrival in Pittsburgh the guests were taken by bus to the Homestead works, where the late morning was spent in viewing the structural mills and the afternoon in the new plate mill, with buffet luncheon being served at noon in the mill cafeteria.

Visitors were especially impressed with the fine finish, close tolerances and flatness of the plates that came off the new mill, and an object of special interest was the rocking shear, a new development, which is the invention of A. W. Soderberg, chief engineer of the Homestead works. For years the steel industry has been puzzled as to how to overcome the bow or arch that is caused when straight-edged shears cut through wide plates. This bow necessitated an additional leveling process. Mr. Soderberg had given the problem considerable study. While at home one night he idly tipped a rocking chair with his foot and he noted that only a relatively small portion of the rocker touched the rug at a given moment. He worked out a small model shear, based on the rocking chair idea and tried it out with sticks of chewing gum, which were so easily snipped that it was determined that the principle could be applied to the shearing of plates. The outcome is one of the outstanding developments of the new installation.

Benjamin F. Fairless, president of Carnegie-Illinois Steel Corp., was toastmaster at the dinner. The first speaker was Myron C. Taylor, chairman of United States Steel Corp., who, without referring to the Committee for Industrial Organization or John L. Lewis by name, deplored "the occasion of any controversy among men of similar intentions in their joint work of management and production and their relation to the public." Mr. Taylor added that "if patience is invoked, if all prejudice and ill feeling are discarded, if honest intention to cooperate predominates, if self interest is subordinated to the common good, we can and must through common effort . . . accomplish that equitable relationship between the owner, the worker and the public which will solve our existing economic discord. . . ."

In the face of its present great problems, what is management to do "if its trust for those whom it serves is to be administered wisely and successfully?" Mr. Taylor asked. "It goes without saying," he added, "that it should be honest, that it should be earnest and competent and alert and farsighted. It must be attuned to the times and to the evolution in human affairs which is constantly taking place. It should actually hold in intelligent and equitable relationship the interests of those who own, those who work, those who consume. That is what management has been trying to do. And of its sincerity in these responsibilities there can be no doubt."

Mr. Taylor took the occasion to speak in a laudatory manner of Benjamin F. Fairless and William A. Irvin, and called attention that the latter began his service with United States Steel Corp. on the very date of the dinner 42 years ago.

Preceding his announcement regarding the corporation's further improvement plans, Mr. Irvin dwelt a little on the early history of steel making and of steel men in the Pittsburgh area. He called attention to the fact that in 1901, when United States Steel was formed,

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the ingot producing capacity of the corporation in the Pittsburgh district was 5,944,000 gross tons, while today it is 11,879,000, almost exactly double. During that period of growth the corporation has expended hundreds of millions of dollars in the Pittsburgh area. "Our faith in the position of Pittsburgh as a steel producing and manufacturing center has at no time waned," said Mr. Irvin.

In addition to those whose names have been mentioned, other officials and directors of United States Steel Corp. who attended the celebration are E. R. Stettinius, Jr., chairman of the finance committee; John Hulst, Robert Gregg, R. H. Watson, C. S. Belsterling, vice-presidents. There were also many operating and sales officials of subsidiary companies, presidents of railroad companies, bankers and financial editors of metropolitan newspapers and editors of trade and technical publications and a large number of the corporation's customers. Among the guests was Charles G. Dawes, former vice-president of the United States.

Tool Engineers Form Pittsburgh Chapter

THE Pittsburgh chapter of the American Society of Tool Engineers was formed Jan. 8 at a meeting of the section's mechanical executives, engineers, and designers. Forty-five members were enrolled as charter members, making it the largest chapter to be installed by the society.

Ford R. Lamb, national president of the society, addressed the meeting and outlined the functions and purposes of the organization. The members elected James R. Weaver of the Westinghouse Electric & Mfg. Co. chairman, D. L. Shelly of the Westinghouse Air-brake Co. secretary, and Malcolm F. Judkins of the Firth Sterling Steel Co. treasurer. Frank Curtis, Firth-Sterling Steel Co., was appointed chairman of the program committee.

Formed to study the problems of manufacturing executives and shop men, the society was organized in Detroit in 1932. Since then eight chapters have been installed in Racine, Cleveland, Milwaukee, Chicago, Bridgeport, Hartford and Pittsburgh. There are now over 4000 members, and the society has received wide recognition for its work in standardization and making information available for its members during the past five years.

S.A.E. Annual Meeting Points Air and Auto Trends

DR. HUGO ECKENER, chairman of the board, German Zeppelin Transport Co., in speaking at the Annual Dinner of the Society of Automotive Engineers, indicated that experiments during the past summer proved that regular airship travel over the north Atlantic would soon be an actuality. His talk and the dinner, which was attended by 1300, was the highlight of the 32nd Annual Meeting of the Society, held in Detroit Jan. 11 to 15.

The regular flights of the Zeppelins between Germany and Bra-

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zil have proved the feasibility of this kind of ocean travel. During the past summer, ten exploratory crossings were made over the north Atlantic and a route was discovered that is free from most of the unfavorable meteorological conditions found on the usual steamship routes. Dr. Eckener presented detailed figures to show that the Atlantic passage was commercially practical from the point of view of pay load from passenger and mail.

At another meeting, L. C. McCarthy, project engineer of the Glenn H. Martin Co., envisioned high-speed, high-altitude flying boats carrying 100 passengers on overnight service between America and Europe. He described a flying boat that will travel over 300 miles an hour and will follow a great-circle route in the high altitudes to avoid storms.

A group of papers were presented bearing on the trend of aircraft fuselage design in automobile body structures. Edward G. Budd of Philadelphia presented the viewpoint as to passenger cars, Stanley E. Knauss, of Gar Wood Industries, that of buses, while Ralph H. Upson gave a critical estimate from the point of view of an aeronautical engineer.

A trend referred to was that toward the integral construction of body and chassis members which entirely eliminates the separate construction of body and chassis. With due regard to all the problems involved there are many obvious advantages to a system of construction which eliminates the separate body and chassis units and combines them into one homogeneous structure, ready for the motive power, spring suspension and rolling equipment.

If this new method of body-chassis construction gains ground—and it seems probable that it will—the art of flash-welding will again play an important part in securing the fine, homogeneous unit of sheet steel that will be required. No other material will be able to supply the structural and physical effects that sheet steel can provide in this type of construction.

A Chassisless Coach

Stanley E. Knauss, manager, Motor Coach Division, Gar Wood Industries, Inc., devoted a paper to the characteristics of a chassisless bus constructed of steel tubing. Today, the bus operator requires, more than ever before, a type of coach that will not only permit a lower operating cost, but which by appearance, design and construction will produce a passenger comfort approximating that of a motor car.

The Gar Wood coach was designed with these two fundamental ideas. It was conceived by William B. Stout, engineered by aircraft men, and manufactured by a shop personnel who were trained in airplane factories. No one connected with the conception, design or manufacture of the first experimental coach had any previous connection with the bus manufacturing or operating industry. It is only natural that because of these facts the coach produced would be of light weight.

With the fundamentals determined, the coach was built of a weight of less than 6500 lb. with a seating capacity of 24 passengers, and turned over to various operators in order that experience could be had with the experimental model through actual daily service. Late last spring the coach was slightly redesigned to facilitate production.

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Ten years ago the production problems in welding a tubular framework of this size would have been considerable, but with the strides made in the last few years in the art of welding, it now seems almost impossible for a man with the slightest welding experience to make a poor weld.

In criticizing the aircraft trend in body structure design, Ralph H. Upson indicated that the automobile stylist has adopted the semblance of streamlining and let the substance go. Even at that it takes a good deal of imagination to see much airplane design in the present-day automobile. Despite the smoother profile lines, the net gain is but a small fraction of what is readily possible. Specifically, the basic trouble is failure to secure a balanced design. In the last analysis, proper balance and suitability for the purpose is the principal basis for good looks. It is certainly the basis for the eye appeal of the modern airplane. And for lack of such basis, most of the lines affected by the present-day automobiles cannot long endure either practically or artistically.

In the matter of weight, there is more talk today about the value of lightness and "an airplane type of structure" but still the practical results are negligible, the main trouble being a lack of balance or unity in the design.

Spot Welding Aluminum

As a result of intensive development work in the past five years, spot welding of aluminum alloys is now commercially practical, it was pointed out in a paper by G. O. Hoglund, Aluminum Co. of America. Principal applications have been spot and seam welding of gasoline tanks for airplanes and buses and the attachment of gussets and stiffener plates and panels to channels and angles. In fact, the technique is applicable to the assembly of almost any parts with a thickness of less than 3/16 in. which in past practice have been riveted. Production economies are obtainable and in the example of airplanes the absence of rivet beads is an appreciable factor in reducing drag.

Aluminum and aluminum alloys have comparatively high thermal and electrical conductivity. Therefore, the amount of current to make a weld is high compared to that required for other materials, and the time period must be comparatively short, or undesirable melting and distortion will occur in the parent material near the weld. Transformer capacity is a function of throat depth and the distance between the arms of the machine and the gauge of the material to be welded. Experience has shown that a machine should deliver at least 24,000 amp. at the tips to weld 1/16-in. material, 33,000 amp. for ⅛-in. material, and 42,000 amp. for 3/16-in. material. An auto-transformer that will control the primary voltage from 20 to 100 per cent full voltage in 25 to 30 steps will provide adequate control of the current.

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varying from 2 to 25 cycles of the standard 60-cycle current wave are required. Good results can be obtained on many types of work with the non-synchronous contactor-type timers actuated either mechanically or by vacuum tubes.

In seam welding it is essential that full electronic equipment be used. The technique required involves delivery of the current to the work at a duty cycle of less than 30 per cent.

Preparation of the work to insure consistent strength of the welds and rapid welding, involves proper fitting of the parts and cleaning the surface. It is essential that contact between adjacent parts be obtained in assembly of the parts to be welded. If a large portion of the pressure between the tips is used to draw the parts together, the strength of the welds will not be consistent. In addition, improper fitting of the parts will cause distortion in the structure and perhaps preloading of the welds.

Production speed in making spot-welded structures varies from five spots per min. for large, unwieldy parts, such as gas tank assemblies, to 150 spots per min. for small parts that can be handled easily by one man. In seam welding, speeds of 1 to 6 ft. per min. are attained for gas or liquid-tight welds, and from 6 to 15 ft. per min. if the spots are placed intermittently.

Another factor that is of importance in using spot welds concerns the effect of the distance between the center of the spot and the edge of the joint. Placing the spots too near the edge of the sheet permits squeezing out of some of the molten metal because of lack of mechanical support around the weld. On 52S½H sheet, the welds should be placed at least four times the thickness of the sheet from the edge. The distance between the spots is also important. Spacing the welds too close together provides a shunt for part of the welding current through the adjacent spot.

Aircraft Engine Materials

A very comprehensive review of all the metals and alloys used in aircraft engines was presented by J. B. Johnson, Chief, Materiel Division, U. S. Army Air Corps, of Wright Field.

Practically all failures of engine parts and service show typical fatigue fractures but as far as the U. S. Army is concerned, no fatigue test has been specified for the acceptance of aircraft parts.

Steel of the best quality may produce unsatisfactory forgings. Common difficulties are surface laps below the allowance for machining, shatter cracks and flow lines that do not follow the surface contour of the finished part. It is quite general practice to section and etch forgings in order to study the grain flow and eliminate any lines perpendicular to the surface at highly stressed sections, such as fillets. The first two-mentioned difficulties can also be detected by etching or by magnetic inspection. Correction of grain flow can be accomplished by changes in the die.

Cylinder barrels have passed through several stages of evolution. Hollow forgings are now standard practice and have the advantages of uniform grain flow and minimum machining. Chrome-molybdenum steels, Brinelling around 300, have come into use in place of the normalized half-hard carbon steels of 200 Brinell used a few years back. The latest effort to reduce wear has brought in the nitrided sleeve with a hardness equivalent to 900 and a superior corrosion resistance.

A study of valve spring failures indicates that imperfections in the surface of the wire are usually responsible. Special processed wire is used, the aim being to eliminate decarburization, pits, scratches and seams. In place of imported high-carbon steel music wire, chrome-vanadium steel is now the preference, due to operating temperatures up to 300 deg. F.

The modern exhaust valve for a high-performance engine is forged from austenitic steel containing 14 per cent nickel, 14 per cent chromium, and with or without 1 to 2 per cent silicon which is provided to supply strength at elevated temperatures and corrosion resistance. The seat is faced with a hard material such as Stellite and the tip with a similar material or an oil-hardening steel in order to prevent oxidation of the former and mushrooming of the latter. The oil-hardening cobalt-chromium and 18 per cent chromium-molybdenum steels are satisfactory when undoped fuels are used, but will rust badly during idle periods in the presence of tetra-ethyl-lead condensate. The chrome-silicon-tungsten and chrome-nickel-silicon steels have a tendency to stretch at temperatures approaching 1200 deg. F. Valve steels contain more seams than low-alloy steels and several etchings of a valve are made before final polishing. Magnetic inspection is not possible with austenitic steels.

Budgetary Control

In a paper describing budgetary control of factory expense at one of the Chrysler plants, George Miller, budget supervisor, pointed out that 99 per cent of budget problems can be solved by foreman contact. In the plan used at Chrysler the budget department provides all the necessary operating information to the foremen as well as the divisional superintendents and works manager, but it is rarely the case that any problem of ab-

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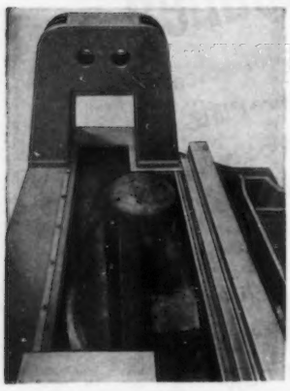

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normal expense has to be taken out of the foreman's hands. Non-variable budgets are based on a factor of time, whereas variable budgets are related directly to production activity in terms of dollars of allowance per $100 for direct labor.

Close Machining Practice

A most important factor in the development of machinery and equipment has been the present policy of automobile manufacturers to share their experiences with their competition, it was pointed out by Fred C. Pyper, general master mechanic, Buick Motor Co., who spoke on developments in close machining practice. This policy has not resulted in duplication of practice, since the selection of equipment must always be based on such individual governing factors as volume requirements, necessary accuracy, investment involved and existing equipment; in other words, its adaptability to the particular requirements.

Increased volume demands have justified the design of special machines and their development has made a major contribution toward accuracy, interchangeability and economy. The development of special machines has not been confined to machines designed to perform any one basic operation, and there are today machines which perform drilling, turning, boring, and milling operations simultaneously, in some cases completely finishing the unit in one machine cycle. There are several outstanding advantages to this type of machine, namely, economy of productive cost, economy of floor space, possible economy of investment and greater accuracy due to the fact that all operations are performed at one setting, causing all machine surfaces to be held in proper relation to each other.

Turning and boring operations are now universally done on multiple-spindle lathes of the horizontal and vertical type and to these machines have been added multiple heads for drilling and reaming. They are rotary or continuous in operation and built with varying numbers of spindles to suit requirements.

Grinding was formerly a very costly operation and for that reason it was used only on hardened parts and parts requiring a finish which could not be otherwise obtained. It has, however, become a universally approved method of finishing surfaces of all shapes. Grinding is not only used where extreme accuracy is required, but it has successfully taken over many finishing operations formerly performed on milling, turning and boring machines, insuring greater interchangeability than was formerly practical.

There has always been a constant demand for better boring in productive operations, greater accuracy in regard to size, straightness, location and finish. This demand has been met by the machine tool builder with a machine built with extreme rigidity, capable of high speeds, with feeds hydraulically operated, to which the tool engineer has adapted single-point diamond and tungsten and tantalum carbide tools, making precision boring on productive parts not only possible but most practical and economical. This principle of finishing is particularly adapted to finish boring cylinder bores, wrist-pin holes in piston connection rods, transmission gear bearings, and oil-pump bodies. These machines operate at a rate of 400 ft. per min. on cast iron and as high as 1500 ft. per min. on aluminum.

New
1937 Lathes
THE new 1937 Series South Bend Lathes are recommended for the finest and most accurate work in the tool room, machine shop, manufacturing plant, and laboratory. Offered in sizes 9" to 16" swing, in bed lengths from 3' to 14', Motor Drive and Countershaft Drive.
Catalog No. 96 shows the new 1937 Series South Bend Precision Lathes in all sizes and styles. A valuable book for the shop man, engineer, and plant executive. Sent free, postpaid, upon request. A post card will bring it.
SOUTH BEND LATHE WORKS
594 East Madison Street
South Bend, Indiana, U. S. A.
No. 11-A 11" x 4' Quick Change Gear, Countershaft Driven Lathe, complete as shown. Weight 725 lbs.
SOUTH BEND Precision LATHES
Modern Lathes for Modern Industry

Milcor to Spend Million on Expansion

MILCOR STEEL CORP., Milwaukee, manufacturer of sheet metal building products, recently acquired by Inland Steel Co., will increase production by means of a $1,000,000 building program, which will result in 1000 employees being added to the payroll.

Steel & Wire Buys Gerrard Co.

THE American Steel & Wire Co. has purchased 89 per cent of the preferred stock and 96 per cent of the common stock of the Gerrard Co., Chicago, manufacturer of wire tying machinery and bale ties, according to a statement filed with the Securities and Exchange Commission at Washington. The preferred stock acquired has a par value of $200,000 and the common stock $309,000.

Japan Buying Iron And Steel in Europe

LONDON (Special Correspondence)—Japan has withdrawn almost entirely from the Malayan iron and steel market, and quotations for metal goods for delivery in Singapore are being refused. The step is due to the serious shortage of iron and steel now prevailing in Japan. To remedy the position large orders are being placed in the United Kingdom and Continental Europe, especially for pig iron.

British concerns are benefiting and Malayan orders have been received for goods supplied mainly by Japan for some time. Competition in certain lines has wholly disappeared.

Japan's withdrawal is considered temporary only, in view of the market's great value to Japanese manufacturers. According to recent statistics, Japanese exports of iron sheets to Malaya had risen by 69 per cent.

Disston Completing Rebuilding Program

THE laying of a cornerstone of a small building at the Tacony, Philadelphia, plant of Henry Disston & Sons, Inc., by S. Horace Disston, vice-president and general manager, marked the completion of a program of rebuilding and replacement in the steel division of the company, which was inaugurated in the middle of the depression. Since adopting this program the company has spent nearly a million dollars in new buildings, new machines and new equipment. The new structure will constitute the roll turning shop and will house new equipment for handling, turning and grinding the rolls required in the steel mill.

Safety Council Interviews Executives

"SAFETY is the preservation of man's birthright to live his life free from accident," according to the foreword of a booklet recently published by the National Safety Council, which provides an interesting and enlightening picture of accident prevention work from the viewpoint of the presidents of 23 large industrial organizations, all of which are active members of the council.

Aside from the humanitarion theme of the foreword, as represented by the leading statement, this booklet, by presenting cold facts and figures, deals with the other side of the picture—the economic angle, which is discussed by the executives of such companies as the American Rolling Mill Co., E. I. du Pont de Nemours & Co., Armour and Co., Goodyear Tire & Rubber Co., International Shoe Co., Studebaker Corp., Universal Atlas Cement Co., General Motors, Standard Oil Co. of Indiana and others of similar size and importance.

Also included in the booklet is a chart which outlines the organization, service, and activities by which the National Safety Council serves its members and carries on its national campaign for the elimination of accidents.

Ingersoll Steel Buys Kalamazoo Company

UNITED STATES PRESSED STEEL PRODUCTS CO., Kalamazoo, Mich., has been acquired by the Ingersoll Steel & Disc Division of Borg - Warner Corp. The Pressed Steel company, founded more than 25 years ago, supplies automobile manufacturers with hood handles, seat frames, metal boxes and automobile stampings. It also makes various products used by agricultural implement manufacturers.

A sharp upturn in the sales curve of air conditioning equipment for 1937 is predicted by S. F. Myers, manager of air conditioning sales, Westinghouse Electric & Mfg. Co.

PRECISION SCREENS

In the preparation of food products and in the screening, sizing and straining operations of chemicals, minerals, stone, coal and other materials, perforated metal plays an important part. H&K standards of quality and accuracy assure you of all that is best in screens. May we aid you in your selection?

Grilles of unusual beauty in exclusive designs suitable for public and commercial buildings and private homes. Ornamental sheets for radiator enclosures and metal furniture are furnished of any metal. Write us for prices and samples.

ANY METAL ANY PERFORATION

The Harrington & King PERFORATING Co.

5657 FILLMORE ST., CHICAGO 114 LIBERTY ST., NEW YORK

. . PERSONALS . .

E. M. VOORHEES, vice-president and a director of the Johns-Manville Corp., who has been appointed vice-chairman of the finance committee of the United States Steel Corp. and a member of the board of directors, will assume his new post April 1. Mr. Voorhees is 45 years old and began his business career with the firm of Hollis H. Sawyer & Co., Boston, after graduation from Dartmouth. Later he went to Manila, P. I., for the Pacific Commercial Co., an exporting and importing firm, after which three years were spent with the United States Rubber Co., in New York. Before joining Johns-Manville Corp., Mr. Voorhees was engaged in industrial engineering for William A. Harriman & Co., and Sanderson & Porter. He has been consecutively general auditor, treasurer, secretary, vice-president and director of the Johns-Manville Corp., with which he has been associated for more than nine years.

E. M. VOORHEES

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MERLIN A. CUDLIP, formerly vice-president and secretary of Packard Motor Car Co., has been elected vice-president, treasurer and a director of McLouth Steel Corp., Detroit. During his 18 years with the Packard company he served on several committees of the Automobile Manufacturers' Association and was a director and officer of the Detroit Board of Commerce and of the Employers' Association. Mr. Cudlip has been engaged during most of the past year in a survey of the McLouth company and its relation to the steel industry.

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FREDERICK W. LUCHT has joined the engineering staff of the Carboloy Co., Inc., Detroit. He was formerly with the McCrosky Tool Corp., Meadville, Pa., and prior to that was connected with the Goddard & Goddard Tool Co., Detroit.

HENRY A. ROEMER, president of Pittsburgh Steel Co., was elected a director of the First National Bank, Pittsburgh.

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H. C. MERRITT, manager of the tractor division of the Allis-Chalmers Mfg. Co., Milwaukee, since 1926, has been elected a vice-president of the company. He entered the tractor industry in its infancy, first with the old Hart-Parr Co., now part of the Oliver

FOR BUSES . .
BY PARISH

The modern motor bus has "lines", and Parish created some of them. Take this wheel housing for example. A good stamping job involving a smooth 3" draw in steel .078" thick. The outside curve is 25 3/4" radius.

Parish knows metals and how to form them. This, plus adequate press equipment, enables us to undertake and successfully carry to completion any difficult pressed metal job you can put up to us.

This service is for *you*. Won't you avail yourself of it?

PARISH PRESSED STEEL CO.
Reading, Pa.

PACIFIC COAST REPRESENTATIVE
F. Somers Peterson Co., 57 California St., San Francisco, Cal.

PARISH *Specialists in Stampings of Distinction*

Farm Equipment Co., and next with the old Holt Mfg. Co., since absorbed by the Caterpillar Tractor Co. Mr. Merritt joined the Allis-Chalmers company as branch manager at Wichita, Kan., in 1920.

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ROSCOE SEYBOLD, vice-president and comptroller of Westinghouse Electric & Mfg. Co., East Pittsburgh, has been elected a member of the Union National Bank, Pittsburgh.

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GEORGE T. LADD, president of the United Engineering & Foundry Co., Pittsburgh, has been appointed a director of the Pittsburgh branch of the Federal Reserve Bank of Cleveland for a two-year term ending Dec. 31, 1938.

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A. C. CHILDS has been appointed sales manager of the strip and strip steel sheet departments of the Weirton Steel Co. Mr. Childs was formerly assistant district sales manager of the Detroit office of the Weirton Steel Co. He has been succeeded in that capacity by F. J. WHITE, who for several years has been a member of the Detroit sales staff.

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MILTON E. CLARKE has joined the sales department of the Superior Steel Corp. He will be located at the Chicago office, 2013 Peoples Gas Building, and will assist MORRIS E. LOWDER, district manager.

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HARVEY L. MILLER, assistant manager of tubular products sales, Jones & Laughlin Steel Corp., will be located at Dallas, Tex. Mr. Miller will give special attention to facilitating service on Jones & Laughlin oil country tubular products in the Mid-continent, Southwest, and Gulf Coast oil producing regions.

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ARTHUR L. COLLINS, who has been identified with Horace T. Potts Co., Philadelphia, since 1922, for the past 10 years of which as manager of the tool and alloy steels division, has been appointed assistant sales manager. He is being succeeded as manager of the tool and alloy steels division by ALLAN W. AINSWORTH, who has been with the company since 1927.

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DR. JAMES SHELBY THOMAS, since June, 1933, president of Clarkson College of Technology, Potsdam, N. Y., has been appointed head of the staff of the Chrysler Institute of Engineering. The institute was established originally for graduate engineers employed by the Chrysler engineering division to fit them for masters' degrees, but has been expanded to include undergraduate students who are also employees of the Chrysler Corp.

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DONALD BLANCHARD, formerly editor of *Automobile Trade Journal*, has joined the staff of the Society of Automotive Engineers, New York, as secretary of the engineering relations committee.

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J. W. WEBSTER, until recently operating with headquarters in Richmond, Va., has been appointed sales manager of the South Atlantic district for the New York Belting & Packing Co., New York, with headquarters in Atlanta, Ga. ROBERT W. CRANE has joined the company and will be stationed in Buffalo. EDWARD M. POWELL, chief clerk of the Chicago warehouse of the company, has been added to the sales staff of that district.

L. W. HARSTON, whose appointment as vice-president in charge of sales of Steel & Tubes, Inc., Republic Steel Corp. subsidiary, was announced in these columns last week.

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FRED N. MIZER has been elected president and general manager of Bishop & Babcock Mfg. Co., Cleveland, succeeding the late A. G. Bean. Mr. Mizer was plant manager of the company from 1925 until 1934 when he became first vice-president.

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H. I. DUNPHY and J. H. VAN MOSS have been appointed assistant vice-presidents of the American Car & Foundry Co., New York. W. L. RICHESON, previously in charge of sales in the Cleveland district, has been appointed manager of sales, with headquarters in New York. R. A. WILLIAMS replaces him at Cleveland as district sales manager.

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CARL A. GRAY, who has resigned as vice-president of the Capewell Mfg. Co., has been elected vice-president in charge of production and engineering of the Whitney Chain & Mfg. Co., Hartford.

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JOHN E. WRAY, since 1919 a sales engineer in the Philadelphia district office of the Allis-Chalmers Mfg. Co., Milwaukee, has been appointed manager of that district, succeeding the late D. H. Kelly.

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J. E. WELDY, formerly identified with the Detroit district sales office of the Carboloy Co., Detroit, has been made Southeastern district representative for the company, with office at 1107 South 30th Street, Birmingham.

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J. I. ROBINSON, heretofore general sales manager of the Crane Co., Ltd., Canada, has been elected vice-president, succeeding J. AUSTIN MURPHY, who has retired after having been with the company for 51 years.

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JAMES T. GOW, since 1930 metallurgical engineer with the International Nickel Co., has been appointed research metallurgist on the staff of the Battelle Memorial Institute, Columbus.

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LOUIS B. NEUMILLER, heretofore general service manager of the Caterpillar Tractor Co., has been made sales manager of the company's Central sales division, in charge of the territory lying between the Rocky Mountains and the Mississippi River.

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CHARLES H. LINDSLEY, a physical chemist and for the past two years with the Biochemical Research Foundation of the Franklin Institute in Philadelphia, has been added to the technical staff of the development and research division of the International Nickel Co., New York. DONALD J. REESE, formerly with the Whiting Corp., Harvey, Ill., will carry on research work on cast iron. FREDERICK G. SEFING, formerly assistant professor of metallurgy at Michigan State College, will also be employed on research work in cast iron at the Bayonne, N. J., laboratory of the International Nickel Co.

DAVID T. CROXTON, long affiliated in the pig iron industry in the Central West, has retired from active connection with the Cleveland Cliffs Iron Co., Cleveland. He became general manager of the Cleveland Furnace Co. when it was organized in 1902 and later served as president until the company was taken over by the Otis Steel Co. in 1919. Sales of Otis pig iron were for some time handled by the Cleveland Cliffs Co., with Mr. Croxton in charge.

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JOHN EDWARD DAILY has been appointed Chicago district manager for the Youngstown Sheet & Tube Co. His appointment became effective Jan. 1. He joined this company as general superintendent of its Indiana Harbor works in 1934. Mr. Daily is a native of Terre Haute, Ind., and a graduate of Rose Polytechnic Institute. He entered the steel industry nearly 30 years ago as an employee of the Ohio Works of the Carnegie Steel Co. in Youngstown. Later he was connected with the Brier Hill Steel Co. He also served as vice-president in charge of operations of the Timken Steel & Tube Co., Canton, Ohio, and in 1932 and 1933 was general manager of the Wheeling Steel Co., at Steubenville.

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LELAND H. HILL has been appointed engineer in charge of the transformer division of the Allis-Chalmers Mfg. Co., Milwaukee, to fill the vacancy caused by the death of Louis C. Nichols, with whom he served as assistant since 1911. Mr. Hill was manager of the transformer division of the American Brown-Boveri Co. at the time it was absorbed by the Allis-Chalmers company. Prior to that time he was connected with the Westinghouse Electric & Mfg. Co.

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MATTHEW A. BECK, who was for many years president and general manager of the Milwaukee Crane & Mfg. Co., Milwaukee, until it was merged with the Harnischfeger Corp., was guest of honor at the January meeting of the Engineers' Society of Milwaukee, at which time he was presented with the medal of the American Society of Mechanical Engineers in recognition of 50 years of continuous membership. He is a life member of the society and also of the Engineers' Society of Milwaukee. The presentation was made by L. H. STARK, chairman of the Milwaukee section of the A.S.M.E.

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MOXIE S. GEORGE has been appointed assistant district sales manager in the Milwaukee office of the Inland Steel Co., Chicago. After spending nine years in the operating department of the American Rolling Mill Co., Middletown, Ohio, he entered the sales department in the Chicago office in 1924. He was transferred to the Milwaukee office in 1926, later joining the Moise Steel Co., Milwaukee. Mr. George joined the Inland organization in July, 1934.

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ALEX B. HAWES, for 18 years connected with Walter Wallingford & Co., Inc., broker in pig iron and coke, Cincinnati, has been appointed manager of coke sales of the Wheeling Steel Corp. with headquarters in the Carew Tower, Cincinnati. CHARLES S. DOLD has been appointed assistant manager. During the years that Mr. Hawes was connected with the Cincinnati concern, he supervised coke sales.

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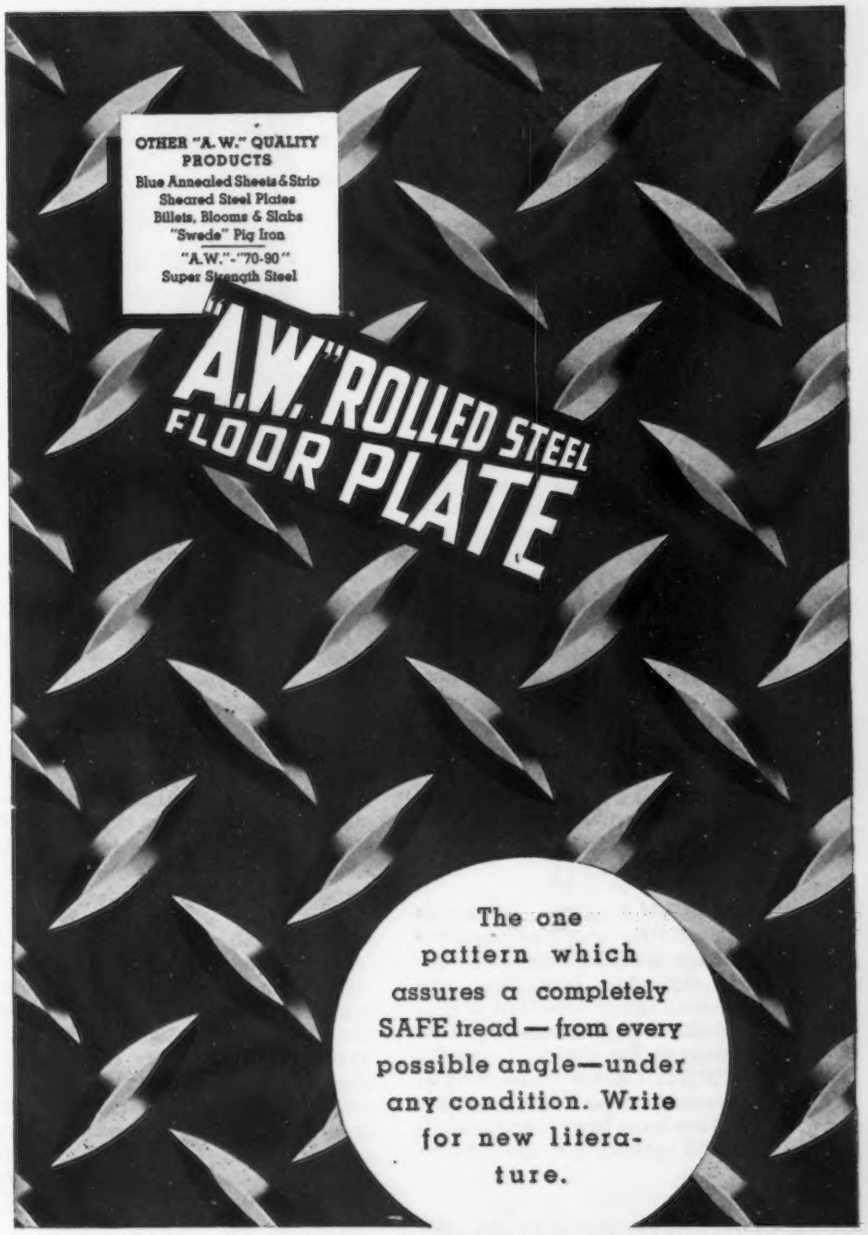
WILLIAM M. HILB, for 40 years an active member of the Cincinnati scrap firm of Hilb & Bauer,


OTHER "A.W." QUALITY PRODUCTS
Blue Annealed Sheets & Strip
Sheared Steel Plates
Billets, Blooms & Slabs
"Swede" Pig Iron
"A.W."-"70-90"
Super Strength Steel
"A.W." ROLLED STEEL FLOOR PLATE
The one pattern which assures a completely SAFE tread — from every possible angle—under any condition. Write for new literature.

ALAN WOOD STEEL COMPANY
CONSHOHOCKEN, PA.
BRANCHES:
Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston
111 YEARS' IRON AND STEEL-MAKING EXPERIENCE

announced his retirement, the past week. Mr. Hilb anticipates engaging in social service activities. He was a vice-president of the Institute of Scrap Iron and Steel and served as a director for many years. The firm, one of the oldest scrap concerns in the country, was organized in 1865 by Mr. Hilb's father, Mannes Hilb and S. Bauer. The firm is one of the oldest subscribers to THE IRON AGE, the elder Mr. Hilb having entered a subscription for the first issue in 1877 and the subscription having been renewed annually to the present time.

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JOHN M. LLOYD, associate mechanical editor of THE IRON AGE from 1911 to 1918, and for several years in charge of the publications of the Society of Automotive Engineers, has joined the staff of *Mechanical Engineering*, the official publication of the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

Steel Meeting at Del Monte, Cal., Feb. 11

PACIFIC Coast iron and steel manufacturers and jobbers will gather at Del Monte, Cal., Feb. 11, 12, and 13 for the thirteenth annual conference of the iron, steel and allied industries. Among subjects to be discussed are: important developments in the steel industry, labor relations, effects of Federal enactments on steel distribution, meeting the problem of foreign competition, and merchandising for profit.

Steel Merger Rumors Denied

OFFICIALS of the Pittsburgh Steel Co. and Sharon Steel Corp. have denied rumors circulating to the effect that these two companies, Spang Chalfant & Co., Inc., Follansbee Brothers Co., Empire Sheet & Tin Plate Co. and the A. M. Byers Co. are to be merged in the near future. Reports of similar nature have been heard periodically and came to life again a few weeks ago.

The recent purchase by the Nazareth Railway in Brazil of 5187 metric tons of rails and accessories from Japan is believed to be Japan's first important sale of rails in South America, and marks the entry of Japan into competition in this item with other world producers.

...OBITUARY...

J. F. MAX PATITZ, who rose from errand boy for the old E. P. Allis Co., Milwaukee, to the position of chief consulting engineer of the present Allis-Chalmers Mfg. Co., in 51 years of service, died suddenly on Jan. 3 of a heart attack at the

J. F. M. PATITZ

age of 70 years. He was born in Germany, coming to America in 1882. He entered the Allis office in 1885. Despite the fact that he never had formal technical school training, Mr. Patitz took a leading part in the development of steam turbines, gas engines and other important Allis-Chalmers products. He was advanced to chief consulting engineer 25 years ago and was active until his death.

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FRANK M. GREGG, organizer of the Cleveland Worm Gear Co. in 1912, and president of that company for about 10 years, died at Ft. Meyer, Fla., last week. Mr. Gregg was a pioneer in introducing in this country from England the worm drive for motor vehicles and his activities in that direction helped to lay the foundation for the later development of worm drive speed reducers.

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W. LOWELL ROBERTSON, general manager of the Robertson Steel & Iron Co. and president of the H. L. Brown Fence Co., Cincinnati, died in that city last week after a brief illness. He was 44 years old. Born in Cincinnati, Mr. Robertson was the son of William F. Robertson, founder of the steel and iron company. After graduation from Yale University in 1914, Mr. Robertson joined his father in business. He succeeded to the management of the company upon the retirement of his father a year ago.

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EDWARD H. LEE, recently retired from the presidency of the Chicago & Western Indiana and the Belt Railway of Chicago, died Jan. 10 at his home in Chicago. He at one time served as chief engineer for the above-mentioned railroads. He was past-president of the Western Society of Engineers and a member of the American Society of Civil Engineers.

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DONALD S. CLUTE, sales engineer, Cadillac Machinery Co., Detroit, died on Jan. 8 of influenza, aged 44 years. He had been connected with Cadillac for 14 years. He represented the Oilgear Co. in Cadillac office for 10 years and spent two years with Oilgear Co. at Milwaukee during the depression. For the last two years has been State representative.

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EUGENE N. STROM, former vice-president of the Pettibone-Mulliken Co. and the Strom Ball Bearing Co., Chicago, died Jan. 11 at Golden Beach, Fla., where he had made his home since retirement from business.

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R. H. NOBLE, treasurer of the Noble & Westbrook Mfg. Co., East Hartford, Conn., died on Jan. 15, aged 65 years.

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F. D. WHITE, president of the Holmes Iron Co., Rutland, Vt., died in Boston on Jan. 11, aged 73 years.

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PETER GRAY, long connected with Peter Gray Corp., Cambridge, Mass., and recently with Peter Forge Mfg. Co., died at his home in Arlington, Mass., on Jan. 10, aged 51 years.

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JAMES T. GLOVER, for 25 years manager of the steel furniture firm of the Berger Mfg. Co. of Massachusetts, died at his home in Wollaston, on Jan. 13.

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HUGH R. GRABLE, president and general manager, United Metal Products Co., Canton, Ohio, died Jan. 16, aged 46 years.

New Pricing Plan for Scrap Presented at Dealers' Convention

A NEW pricing plan for iron and steel scrap that would, if it could be adopted, eliminate violent fluctuations; the possibility of a quota system for exports, similar to that now in effect on tin plate scrap, and the lack of adequate profits in scrap trading under present conditions, notwithstanding the highest prices since 1925, were subjects that were discussed at the annual convention of the Institute of Scrap Iron and Steel, held Jan. 14-16, at the Netherland Plaza Hotel, Cincinnati.

The proposal for a new pricing plan for scrap was put forward by W. W. MacMillen, purchasing agent of the National Malleable & Steel Castings Co., Cleveland, who suggested a price for No. 1 heavy melting steel equal to 40 per cent of the average price of plates, shapes and bars, with differentials for various other grades and for various markets.

"What prompted this thought on my part," said Mr. MacMillen, "is that scrap is the only commodity whose future cost cannot be determined in advance with any accuracy, whereas ore, pig iron, coal, manganese and all other basic commodities entering into steel production are contracted for at a fixed definite price many months in advance. Scrap is the only item that is priced from day to day."

Emphasizing the importance of scrap in present-day steel production, Mr. MacMillen said he thought that consumption would be larger if there were greater price stability.

He quoted an economist who said that, "One hundred million dollars a year is the nuisance tax the steel industry is paying to enjoy the luxuries of speculative scrap purchases." Adding that "the pendulum of scrap quotations swings to extremes far wider and more severe and radical than those of the steel mill products produced from this valuable reclaimed iron and steel," Mr. MacMillen presented his plan as follows:

He proposed the use of the average price of plates, shapes and bars at Pittsburgh as a base, selecting these products because "their production involves a minimum of finishing processes and hence they reflect to a large degree the actual costs of the materials of which they are produced." Further he contended that because of the universal use for these products they are "good barometers of the general business conditions that have a direct bearing on the value of iron and steel scrap."

Scrap Price Swings Greater Than in Finished Steel

"Looking over the average prices of these three steel mill products for a 10-year period we find," said Mr. MacMillen, "a peak of $53 and a low point of $28. The maximum fluctuation from high to low was 89 per cent of the minimum figure. The corresponding extremes of heavy melting steel were high $25.30 and low $12, a movement from low to high of 111 per cent.

DARWIN S. LUNTZ
President of Institute of Scrap Iron and Steel

"Comparison of average prices over the 10-year period indicates 40 per cent of the average prices of plates, shapes and bars as being the correct percentage to use for heavy melting steel, with differentials for other markets based on freight rates from producing points as at present, so that the same relative delivered price differentials at the different consuming points would be preserved. Other grades of scrap would be based on their proper relationship in value to heavy melting steel.

"Had this plan been in effect during the past 15 years, said Mr. MacMillen, "scrap would have reached a low of only $11.20 and a high of $21.20, whereas under the open market method the low was $8.25 and the high $25.30."

On the subject of exports of scrap, E. C. Barringer, editor of the *Daily Metal Trade*, Cleveland, said that the Institute of Scrap Iron and Steel should at the present time "be building up a defense against a possible bill to restrict the exportation of all scrap. The basis for such a bill can be foreshadowed; it will be that we should not ship out of the country a material that is irreplaceable and constitutes an irreparable drain on our national resources. A case study could be made now of the routine followed by the tin plate scrap export bill in becoming a law."

Institute Membership Shows Large Growth

Darwin S. Luntz, of the Luntz Iron & Steel Co., Canton, Ohio, president of the institute, in his opening address called attention of the members to the satisfactory growth of the organization, which in 1936 reached the peak of its membership rolls with a total of 529 firms and corporations, whereas in the last era of prosperity, in 1929, the total barely reached 400. He also commented that the institute's members now handle 90 per cent of all of the market scrap sold in the United States.

"The institute," he said, "has been officially called into conference by producers and consumers of scrap during 1936 to assist in the solution of problems affecting the mutual relations of the scrap industry and its customers. It is expected that negotiations now being undertaken will ultimately result in conferences and understandings between the American Iron and Steel Institute and the Institute of Scrap Iron and Steel as the two representative spokesmen of both industries. . . . As our customers clearly understand the importance and the value of the service which we render, the various problems that have disturbed the relations of the steel industry and the scrap industry will gradually be solved and adjusted."

Lack of Adequate Profits Discussed by Dealers

In the addresses by presidents of various chapters the question of adequate profits for scrap dealers was uppermost. Milton Levenson of Roxbury Iron & Metal Co., Dorchester, Mass., president of the Boston chapter, deprecated what he termed "spite" and "hunch" buying and added that the dealers can themselves improve their profits by improving their own methods.

Arthur M. Price, of the Price-Watson Co., Chicago, said that "it is hard to believe that a group of intelligent men who are in the scrap business today cannot come to some mutual understanding and make reasonable profits."

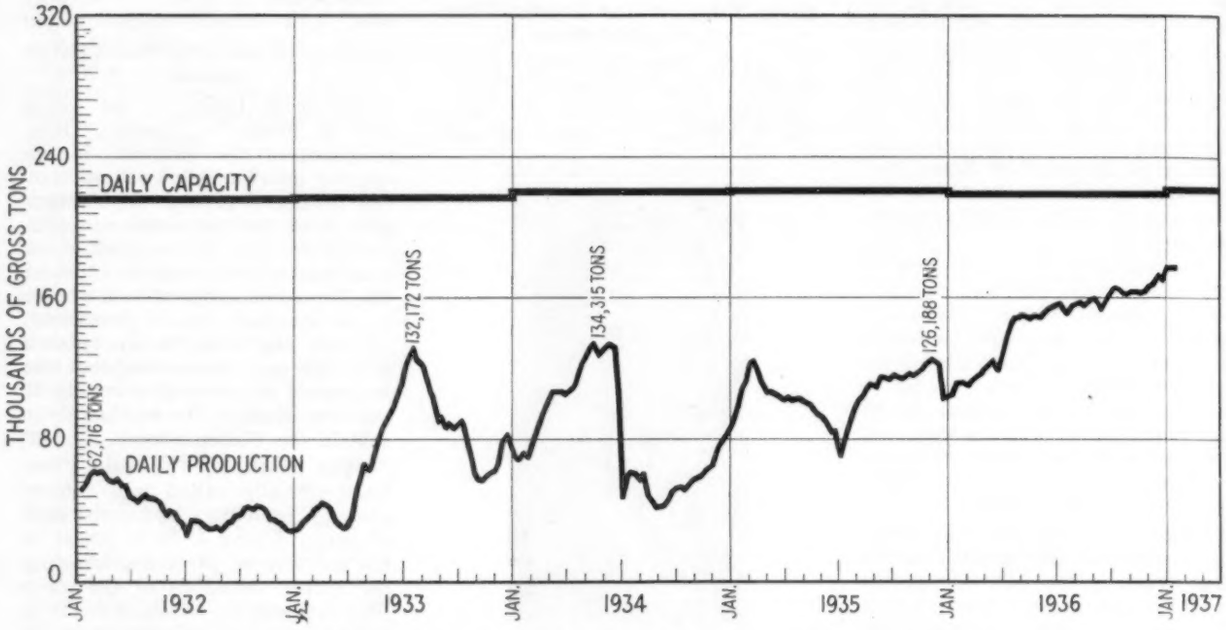
Sam Kasle, of the Kasle Iron &

(CONTINUED ON PAGE 82)

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1933-1937

Current Week	Last Week	Weeks Ended Jan. 18, 1936	Jan. 19, 1935	Jan. 20, 1934	Jan. 21, 1933
180,397	177,057	111,931	114,012	70,461	36,835



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended Dec. 19, 1936	Jan. 18, 1936	Jan. 19, 1935
Pittsburgh	82.0	80.0	79.0	37.0	32.0
Chicago	77.0	77.0	77.5	52.0	57.0
Valleys	77.0	75.0	80.0	65.0	60.0
Philadelphia	56.5	56.5	54.5	39.0	29.0
Cleveland	79.0	76.0	76.0	61.0	69.0
Buffalo	79.0	78.5	84.0	40.0	43.0
Wheeling	94.0	94.0	94.0	72.0	90.0
Southern	77.5	74.5	69.5	50.0	29.0
Ohio River	96.0	97.0	91.0	79.0	80.0
Western	91.5	91.5	76.5	40.0	35.0
St. Louis	75.0	75.0	75.0	77.0	30.0
Detroit	100.0	100.0	100.0	95.0	76.0
Eastern	95.0	95.0	85.0	40.0	30.0
Aggregate	81.0	79.5	79.0	51.0	49.0
Average Year to Date	80.0	79.5	66.9	50.1	45.3

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended Jan. 19, 1937	Jan. 12, 1937	Dec. 21, 1936	Jan. 21, 1936	Year to Date 1937	1936
Fabricated structural steel awards	12,950	30,025	23,855	13,950	62,625	52,800
Fabricated plate awards	2,175	3,680	175	1,400	8,580	45,150
Steel sheet piling awards	0	2,200	2,355	0	4,150	3,600
Reinforcing bar awards	2,600	6,345	4,095	8,300	8,945	34,750
Total Lettings of Construction Steel	17,725	42,250	30,480	23,650	84,300	136,300

. . . . SUMMARY OF THE WEEK. . . . .

. . . Steel ingot production up to 81 per cent as new business adds to heavy backlogs.

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. . . Automobile strikes the only unfavorable factor as other lines take more steel.

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. . . Renewed export demand for scrap raises price on Atlantic seaboard above mill offers.

CONTINUANCE of the automobile strikes is the only unfavorable factor in the steel situation, as new business accumulates and adds to already heavy backlogs. Bookings thus far in January by a few of the larger companies are in excess of shipments. Consumers of sheets are insisting on getting new orders on mill books, with the result that considerable tonnage has been placed that cannot be shipped before April; in such instances buyers readily agree to pay the market price in effect at time of shipment.

Steel ingot production, at 81 per cent, has been pushed higher in most districts, Pittsburgh having attained a rate of 82 per cent, Youngstown 77 per cent, Cleveland-Lorain 79 per cent, and Buffalo 79 per cent, while the only loss is in southern Ohio, where one open-hearth furnace was taken off, still leaving that area at 96 per cent. Detroit, the seat of the automobile strikes, maintains capacity output.

While total motor car output has been reduced by General Motors suspensions, having declined last week to 85,703 units from 92,142 in the week before, some automobile companies not affected by strikes are increasing production and are taking a large volume of steel. Ford Motor Co., now virtually independent of outside glass plants that are strike-bound, has raised its daily output to 5300 cars and is aiming for 7000. Nash has also stepped up its schedules. Meanwhile, there is a possibility of an early settlement of the glass strike, which will pave the way for capacity resumption of automobile production when General Motors strikes are ended.

THE outstanding development of the week is the return to the market on a more liberal scale of steel consuming industries that have been backward buyers for some time, notably the oil companies and the public utilities. Production of rail orders is being increased; structural fabricating shops, which have recently booked a good deal of business, are specifying more freely; the farm machinery industry has large orders and counts upon a very active spring demand, and tin plate rolling schedules are at 97 per cent of capacity, as can companies specify in volume, particularly for beer and oil cans. Another feature of current and prospective steel business is the high rate of activity among household equipment manufacturers.

Further railroad equipment buying is also in immediate prospect. The Missouri Pacific is inquiring for 2225 freight train cars, the Milwaukee Road will buy 2000, the Western Pacific 350 cars and 11 locomotives, and the Chicago Rapid Transit wants 600 passenger trailers. In addition to these new inquiries, several previously reported totaling several thousand cars have not yet been awarded. In structural steel, new projects include 7000 tons for a Mississippi River bridge, 6000 tons for Government buildings at Sacramento, Cal., and 400 tons for the Midtown-Hudson tunnel, New York.

In recent buying there has been, without doubt, an element of protection against possible labor troubles in coal mines or steel plants, but the fact remains that consumers have not been able to lay in stocks of burdensome size, so rapidly is steel being used. Jobbers are barely able to maintain well-assorted stocks because consumers affected by delayed mill deliveries are drawing upon them more heavily.

AS ingot production advances steel companies are again faced with an acute problem in getting sufficient supplies of pig iron and scrap. High scrap prices are forcing steel plants to resort to greater use of pig iron where possible, and the situation is further complicated by renewed export demand for scrap, principally from Japan, England and Italy. These countries, which had partially withdrawn from this market owing to high prices here, have now raised their offers to a point above those of domestic mills. Exporters are paying $17.25 to $17.50, Philadelphia, and $15.50, Boston, for No. 1 heavy melting steel, these prices, with rail freight rates added, being higher than can be obtained in the domestic market. Large tonnages are said to have been contracted for. No. 1 steel scrap for domestic use has advanced 50c. a ton at Philadelphia and 25c. at Chicago, raising THE IRON AGE composite price to $18.42, highest since Feb. 10, 1925. The peak for that year was $20.83 on Jan. 13.

. . . PITTSBURGH . . .

. . . District operating rate rises to 82 per cent, highest since early 1930.

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. . . Heavy products in good demand, current bookings exceeding shipments in some cases.

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. . . Substantial improvement occurs in pipe as oil companies come into market.

PITTSBURGH, Jan. 19. — Attempts by producers to work off tremendous backlogs and the influx of new orders at a far better-than-expected rate, are responsible for a two point rise in steel ingot output in the Pittsburgh District to 82 per cent of capacity. This operating rate is unusual at this time of the year, and matches those prevalent early in 1930. The Wheeling district remains unchanged at 94 per cent.

Despite heavy commitments last month, the volume of new business since the first of the year has reached the point where bookings of some producers are ahead of current shipments. The bulk of orders received in the past two weeks consists of heavy plates and shapes, but a satisfactory volume of sheet business has materialized. The same state of affairs exists with respect to wire specifications and to a lesser degree hot-rolled bar bookings. Activity is brisk in the pipe market, with mills reporting substantial improvement in aggregate demand. Although increased pipe specifications may be due to anticipation of higher prices in the second quarter, unseasonably mild weather and an increase in demand for crude oil have had their effect. Specifications for heavy plates and shapes representing projects bid on previous to the end of 1936 are pouring in, and this trend will continue until the end of January, the time limit set for the entering of firm contracts. Tin plate operations continue at a high rate, approximately 97 per cent of capacity. Strip producers have not enjoyed the same strong demand as sheet makers, but their orders are better than expected, and production, because of backlogs, is being maintained at practical capacity.

Pig Iron

Although new business is lighter than at this time last month, the market is by no means dull. Merchant producers are operating at practical capacity and pressure is being exerted for delivery of tonnages on the books. Pig iron is being shipped as fast as it is made and producers are having little opportunity to pile stocks. Coverages before the price increase on Jan. 1 were not as great as was expected and continued activity in this market can be looked for throughout the first quarter.

Semi-Finished Steel

Heavy production and shipping schedules are in effect as producers attempt to whittle down exceptionally large backlogs. This is being hampered to some extent by a better-than-expected volume of new business at higher prices. Some shopping around is evidently being done by consumers as some steel companies' operating schedules call for all the raw steel they can produce.

Bolts, Nuts and Rivets

Notwithstanding heavy commitments last month, bolt and nut business within the past week has stepped up sharply. Although not as great as the volume received in December, current bookings are emanating from all sources. There is unmistakable evidence that some customers understimated their requirements when placing commitments last month. Local producers are practically unaffected by the automobile situation and heavy shipments are moving forward to car repair shops, car builders and jobbers.

Bars

A fair and well diversified volume of business has been booked in the past week. Implement makers and jobbers have come in to the market recently at first quarter prices. Backlogs are still running three to four weeks and, if the present rate of new business continues, the delivery situation will not get any better. Customers are fully recognizing the fact that to get the desired delivery future requirements must be anticipated. With most European steel mills booked solid for months to come, numerous export inquiries have made their appearance. It is expected that this type of business will increase sharply over the next few months. This situation is also exerting its effect on maintaining a rigid price structure, and in some cases the law of supply and demand is bringing higher prices for export steel than the current domestic quotations.

Cold-Finished Bars

Backlogs are still averaging six weeks and incoming business is of such volume as to prevent any leveling off of operations. New bookings are emanating from machine manufacturers, and indicative of the good miscellaneous business is the placing of fair-sized orders by the jobbing trade. Local producers have as yet been unaffected by automobile suspensions, and it is felt by many that the labor situation may be cleared up before operations are seriously hampered.

Reinforcing Bars

Producers' interests are centered on fabrication of heavy orders placed previous to the price advance. Fair-sized tonnages are moving to jobbers and no small portion is going into the construction of small, although numerous, privately financed jobs. The heavy demand for other steel products which has resulted in exceptionally good finishing mill schedules, has exerted its influence in making for a firmer price structure on reinforcing material.

Steel Sheet Piling

Bids went in on Jan. 19 for 1900 tons of piling to be used in the construction of dam No. 17 at New Boston, Ill. The general contractors have been named on the Chicago park projects and awards for the piling will be announced within

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Jan. 19, 1937	Jan. 12, 1937	Dec. 21, 1936	Jan. 21, 1936
Rails, heavy, at mill	$39.00	$39.00	$39.00	$36.37½
Light rails, Pittsburgh	38.00	38.00	35.00	35.00
Rerolling billets, Pittsburgh	34.00	34.00	32.00	29.00
Sheet bars, Pittsburgh	34.00	34.00	32.00	30.00
Slabs, Pittsburgh	34.00	34.00	32.00	29.00
Forging billets, Pittsburgh	40.00	40.00	39.00	35.00
Wire rods, Nos. 4 and 5, P'gh	43.00	43.00	43.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.20	2.20	2.05	1.85
Bars, Chicago	2.25	2.25	2.10	1.90
Bars, Cleveland	2.25	2.25	2.10	1.90
Bars, New York	2.55	2.55	2.40	2.20
Plates, Pittsburgh	2.05	2.05	1.90	1.80
Plates, Chicago	2.10	2.10	1.95	1.85
Plates, New York	2.33	2.33	2.19	2.09
Structural shapes, Pittsburgh	2.05	2.05	1.90	1.80
Structural shapes, Chicago	2.10	2.10	1.95	1.85
Structural shapes, New York	2.305	2.305	2.16¼	2.06¼
Cold-finished bars, Pittsburgh	2.55	2.55	2.35	2.10
Hot-rolled strips, Pittsburgh	2.15	2.15	2.15	1.85
Cold-rolled strips, Pittsburgh	2.85	2.85	2.85	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.80	2.80	2.80	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.90	2.90	2.90	2.50
Sheets, galv., No. 24, P'gh	3.40	3.40	3.40	3.10
Sheets, galv., No. 24, Gary	3.50	3.50	3.50	3.20
Hot-rolled sheets, No. 10, Pittsburgh	2.15	2.15	2.15	1.85
Hot-rolled sheets, No. 10, Gary	2.25	2.25	2.25	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.25	3.25	3.25	2.95
Cold-rolled sheets, No. 20, Gary	3.35	3.35	3.35	3.05
Wire nails, Pittsburgh	2.25	2.25	2.25	2.40
Wire nails, Chicago dist. mill	2.30	2.30	2.30	2.45
Plain wire, Pittsburgh	2.60	2.60	2.60	2.30
Plain wire, Ch'go dist. mill	2.65	2.65	2.65	2.35
Barbed wire, galv., Pittsburgh	2.75	2.75	2.70	2.80
Barbed wire, galv., Chicago dist. mill	2.80	2.80	2.75	2.85
Tin plate, 100-lb. box, P'gh*	$4.85	$4.85	$5.25	$5.25

*Practically the equivalent of previous quotations owing to new method of quoting effective Jan. 1, 1937.

Pig Iron

Per Gross Ton:	Jan. 19, 1937	Jan. 12, 1937	Dec. 21, 1936	Jan. 21, 1936
No. 2, fdy., Philadelphia	$22.76	$22.76	$22.3132	$21.3132
No. 2, Valley furnace	21.00	21.00	20.50	19.50
No. 2, Southern Cin'ti	20.69	20.69	20.44	20.2007
No. 2, Birmingham†	17.38	17.38	16.88	15.50
No. 2, foundry, Chicago*	21.00	21.00	20.50	19.50
Basic, del'd eastern Pa.	22.26	22.26	21.8132	20.8132
Basic, Valley furnace	20.50	20.50	20.00	19.00
Malleable, Chicago*	21.00	21.00	20.50	19.50
Malleable, Valley	21.00	21.00	20.50	19.50
L. S. charcoal, Chicago	26.54	26.54	26.2528	25.2528
Ferromanganese, seab'd, carlots	80.00	80.00	80.00	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent of higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$19.75	$19.75	$19.25	$14.50
Heavy melting steel, Phila.	**17.50**	17.00	16.25	12.75
Heavy melting steel, Ch'go	**18.00**	17.75	17.75	13.50
Carwheels, Chicago	**18.50**	18.00	18.00	13.25
Carwheels, Philadelphia	**18.50**	17.25	17.25	14.75
No. 1 cast, Pittsburgh	17.25	17.25	17.25	14.25
No. 1 cast, Philadelphia	**18.75**	17.25	17.25	13.00
No. 1 cast, Ch'go (net ton)	16.00	16.00	15.00	12.00
No. 1 RR. wrot., Phila.	**16.75**	15.75	15.75	13.25
No. 1 RR. wrot., Ch'go (net)	**16.75**	16.50	15.00	11.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$3.65
Foundry coke, prompt	4.50	4.50	4.50	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	**13.00**	12.50	11.00	9.25
Lake copper, New York	**13.12½**	12.62½	11.12½	9.37½
Tin (Straits), New York	*51.00*	51.12½	52.00	46.87½
Zinc, East St. Louis	6.00	6.00	5.45	4.85
Zinc, New York	6.35	6.35	5.82½	5.22½
Lead, St. Louis	5.85	5.85	5.85	4.35
Lead, New York	6.00	6.00	6.00	4.50
Antimony (Asiatic), N. Y.	**14.25**	14.00	12.62½	12.62½

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Jan. 19, 1937	2.330c. a Lb.	$20.25 a Gross Ton	$18.42 a Gross Ton
One week ago	2.330c.	20.25	18.17
One month ago	2.274c.	19.73	17.75
One year ago	2.130c.	18.84	13.58

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1937					$18.42, Jan. 19	$17.92, Jan. 4
1936	2.330c., Dec. 28	2.084c., Mar. 10	$19.73, Nov. 24	$18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

the next week. Demand is good for projects involving less than 100 tons.

Plates and Shapes

Backlogs of heavy structural shapes and plates are increasing sharply, and local mills are assured of a good operating rate for some time to come. Not only do specifications represent identified projects, such as car building programs, but a large volume of plate bookings for repair shop programs has been entered. American Bridge Co. received an award for two standard coal barges involving 300 tons of plates and shapes for the National Barge Co., Pittsburgh. Two other inquiries are expected to turn into awards shortly. The American Bridge Co., will furnish 2100 tons of beams and heavy shapes for an overseas road and toll bridge at Miami, Fla.

Tin Plate

Specifications are flowing in freely and operations are at about 97 per cent of capacity, an unseasonably high rate for this time of the year. Demand for beer plate is good and specifications from makers of quart oil cans continue to show improvement. Backlogs will support present operations for some time.

Sheets

New business has shown further gains, which is considered unusual by producers in view of heavy forward commitments last month. Current bookings are emanating from railroad and electrical equipment manufacturers as well as jobbers. The influx of this fresh business is retarding to some extent the working off of exceptionally heavy backlogs. As a result, sheet mill operations are at practical capacity and it is not expected that automobile suspensions will seriously affect production unless the shutdown is of long duration.

Strip

Producers report an increase in specifications within the past week. Electrical appliance manufacturers, radiator cover makers, and cash register companies have been in the market for more steel recently. Suspensions from automobile manufacturers have not been felt much in this district. Parts makers are loath to hold up shipments because of the certainty of heavy demand from the automobile companies when full operations are resumed.

Wire Products

Manufacturers' wire specifications show further improvement. Orders are coming from miscellaneous sources and bolt and nut manufacturers. Producers have exceptionally heavy backlogs and it is expected that wire production will be at a high level for the next month at least. Proof that jobbers are not carrying abnormal stocks is evidenced by a good volume of merchant wire business within the past week. In addition to current bookings, mills are being pressed for delivery on orders placed last month.

Tubular Products

Demand for oil-country goods has been improving for some time and last week's orders were in good volume. Some of this improvement is attributed to the unseasonably mild weather in some parts of the country, which is enabling producers to better their drilling programs. Increased consumption of crude oil is also necessitating the sinking of a larger number of wells than was thought would be needed. Concurrent with the better building programs both for factories and homes, is a slow but steady increase in standard pipe specifications. Owing to weather conditions, contractors are able to make good headway on buildings, with the result that pipe jobbers are having their stocks reduced by steady demand.

Coal and Coke

Domestic lump coal and domestic coke accumulations continue to pile up, owing to mild weather. No let-up in demand for industrial coal has materialized and users are still accumulating stocks in anticipation of labor disturbances. The furnace coke situation remains strong, although demand for domestic coke is exceptionally weak.

A hand book has been compiled by the Stearns Magnetic Mfg. Co., Milwaukee, in answer to the demand for a standardized catalog containing technical data, illustrations and description of the various phases of magnetic engineering. Comprising 170 pages, the book discusses the separation, concentration and purification of ores, minerals, sands, food stuffs, grain and numerous other classes of materials, pottery and porcelain slip and pulverized clay. Protection of crushers, grinders and pulverizers, and the different processes of wet and dry magnetic treatment are covered, as well as numerous types of friction devices employed in power transmission, and methods as suspended magnet application. Magnetic clutches, brakes and clutch-brake units, duplex clutches and other combinations are shown in text, drawings and illustrations.

. . . Awards of 2600 tons —3300 tons in new projects.

AWARDS

St. Albans, Vt., 100 tons, post office, to Bethlehem Steel Co.

Weehawken, N. J., 100 tons, field office, to Joseph T. Ryerson & Son, Inc.

San Francisco, 495 tons, plant for San Francisco Brewing Co., to Gunn, Carle & Co.

Provo, Utah, 408 tons, viaduct on West Center Street, to an unnamed bidder.

Denver, 129 tons, State bridge, to an unnamed bidder.

Denver, 584 tons, All-American Canal projects, to Bethlehem Steel Co.

Denver, 115 tons, All-American Canal project, to Colorado Fuel & Iron Co.

Denver, 550 tons, Salt River reclamation project, to Bethlehem Steel Co.

Hatch, N. M., 104 tons, reclamation project, to Tennessee Coal, Iron & Railroad Co.

NEW REINFORCING BAR PROJECTS

Pittsburg, N. H., 250 tons, State dam.

Leominster, Mass., 100 tons, State bridge.

New York, unstated tonnage, Midtown Hudson tunnel; bids early in February.

Rochester, N. Y., 130 tons, city incinerator.

Sonyea, N. Y., 116 tons, sewage disposal plant; O'Connell Electric Co., Rochester, low bidder.

Geneseo, N. Y., 100 tons, normal school addition.

Lebanon County, Pa., 135 tons, highway work; bids Jan. 22.

Cleveland, 200 tons, State highway project for Cuyahoga County; bids Jan. 22.

Mattoon, Ill., 130 tons, sewage treatment plant; Dan Pray, Monett, Mo., low bidder.

Peoria, Ill., 230 tons, post office; Lindoff, Bickwell Co., Chicago, low bidder.

Macomb, Ill., 280 tons, training school; Jacobson Brothers, Chicago, low bidder.

Chicago, 100 tons, division 17B for Sanitary District.

Chicago, 200 tons, division Q, sewer; E. J. Albrecht, low on general contract.

Springfield, Mo., 400 tons, post office; Henke Construction Co., Chicago, low bidder.

South City, Cal., 211 tons, malt house for Modern Malting & Mfg. Co.; bids opened.

San Francisco, 205 tons, plant for Standard Brands; bids opened.

San Francisco, 520 tons, Lyon Street approach to Golden Gate Bridge; bids opened.

Increases in 1935 over 1933 were recorded by manufacturers of cutlery and edge tools, according to Bureau of the Census. In 1935, 13,715 wage earners were employed, an increase of 26.9 per cent over the 10.807 reported for 1933. Wages also advanced, the 1935 figure, $13,532,350, exceeding the 1933 total, $8,847,633, by 52.9 per cent. The total value of cutlery and edge tools made in 1935 was $49,057,463, an increase of 31.8 per cent over $37,209,238 reported for 1933. This industry, for census purposes, consists of manufacturers of knives, razors, shears, augers, planes, axes and hatchets.

. . . . CHICAGO . . . .

. . . Automobile strikes only blot on steel business, volume continuing good.

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. . . Improvement seen in demands from utilities and the oil fields.

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. . . Scrap advances 25c to $1 a ton and foundry coke is 50c a ton higher.

CHICAGO, Jan. 19—Both sales and specifications of finished steel products show moderate drop from a week ago, but ingot production remains at its former level of 77 per cent of capacity. Rail releases are coming a little faster and railroad car builders are specifying freely. Fabricating shops are stepping up schedules and the outlook is favorable for the coming months. Some oil producers and distributors are in the steel market and word from Oklahoma and Texas foretells better spring buying of steel for storage tanks and derricks. The public utility field is brightening with new orders and projects not alone for mechanical and electrical equipment but also for line materials as reflected at electrical cable plants. There appears to be not a single cloud in the farm implement sky, and tractor plants have orders ahead and count on heavy spring delivery demands. The automobile labor trouble is the only major blot on the business picture.

Prices for all commodities, excepting reinforcing bars, are strong. This is reflected by scrap, which continues to move higher as evidenced by a 25c. mark-up on heavy melting steel and advances by other grades of as high as $1 a ton.

Steel mills are having no difficulty in redistributing the steel not now being taken by strike-bound automobile plants and, though speculative buying no doubt has been attempted on a broad scale, it is doubtful if users have acquired stock of burdensome size. Many consumers underestimated winter needs and the delivery situation cut them off from undue expansion of inventories.

Pig Iron

Both malleable and steel foundries in the Chicago area are enjoying exceptionally good business and their backlogs are substantial. Jobbing foundries in general report an active market and some of them are booked for several months. The gain in railroad equipment castings has effectively offset any loss which Chicago melters have sustained as a result of the automobile strike.

Coke

Foundry coke has been advanced 50c. to $9.50 a ton, Chicago ovens, or $10.25 a ton, delivered in the switching district. Shipments remain heavy with no let-down in sight.

Sheets

The only major effect on this market of the automobile strike is that deliveries are not being pushed farther into the future. The fact is delivery dates are about stationary, indicating that other consumers are being better served and that they are anxious to take all the sheets that can be moved to them. Most large consuming and the miscellaneous trades are in excellent condition and they see good business ahead. There is fine activity in car roofing sheets, which, combined with general demand for the galvanized product, has pushed deliveries ahead to an average of about eight weeks.

Wire Products

Production remains steady and tonnages marked "hold" by automobile plants are being diverted to other consumers. Wire producers have been enjoying a very favorable position in the matter of deliveries as compared with makers of other steel mill products. Their opportunity to rearrange shipping schedules puts them in exceptionally fine position to make almost any delivery specified. General manufacturing lines are moving in heavy volume and jobbers are clearly leading up to a February buying period which will be the best in years. Although this is the time of year when overhauling and use of equipment is at low ebb, the movement of wire rope remains in good volume. Inquiries from public utilities promise an active spring and summer demand for electrical cables, not only for maintenance but for extension of facilities.

Rails

Releases against contracts are coming in more freely and rail rolling programs are slowly being pushed upward. The production rate is now slightly above 50 per cent of capacity. The railroads are watching steel demand, the delivery situation and the labor picture and, as a consequence, releases come from all parts of the country rather than from those sections where spring work can soon be put under way. Accessories are lagging, but the deficiency can quickly be made up, as productive capacity is far in excess of the country's needs under the best of conditions.

Bars

January shipments are averaging below the December rate, which is a direct reflection of the automobile labor picture. The situation is not serious because much of the hold-up tonnage is being diverted in other directions. Machinery manufacturers are operating at capacity and road machinery plants are enjoying exceptionally good winter business. The farm implement group sees no let-up in sight and tractor plants have orders ahead, with the best of their late winter and spring trade ahead of them. Bar deliveries range from four to five weeks.

Plates

Car companies and railroad shops continue to feed orders and releases to mills, which, added to the general run of business, give plate mills the best operations they have enjoyed in years. New car business has been placed by the Baltimore & Ohio and the Nickel Plate. The Milwaukee Road and the Denver & Rio Grande Western are prospective buyers of freight train equipment. Awards have been made for one dam across the Mississippi River, and bids were taken Monday on another unit. The Shell Oil

Co. will use 600 tons of plates for tanks to be erected in the Northwest, and there are reports that tanks and steel oil derricks will be sought in large quantity in the spring in the Oklahoma and Texas fields.

Structural Material

Shop production is slowly moving upward from its winter low and the prospects are that this upward trend will continue for some months. Some public utility work is making its appearance and there is a noticeable pick-up of industrial building, especially in the Southern States. Bids were taken Monday on another Mississippi River dam and most Middle Western and Mountain States have bridge programs which will give material aid to shops.

Reinforcing Bars

Dealer pricing practices in the Chicago area have changed only to the extent that the $3 a ton advance by mills has been added, leaving wide variation in the matter of warehouse and shop extras. Sales remain at a good winter level, but individual tonnages are small. The same situation prevails as to inquiries, which are well dotted with highway bridge work. Private undertakings are scattered and are of small size, but engineers and architects are busy and attractive work is being scheduled for the spring construction period. Open weather to the middle of January has been a great help to contractors, but their luck seems to be passing as high water hampers many bridge jobs. Bending shops in the Chicago area are busy and report no further recession in operations since several night crews were taken off.

Warehouse Business

Higher prices are in full effect and resistance to them is not disturbing except in cases here and there where buyers, finding steel prices high, are looking for substitutes and sometimes finding them in the form of plastics. January sales are running ahead of the December average, which was bolstered by pending price advances.

Machinery and Allied Products Institute, of Chicago, has issued a 16-page booklet on the subject of "Depreciation Reserve Policies." This is the result of a study by a committee representing management, engineering and accounting and contains timely suggestions for American industrial executives in view of recent legislation.

. . . Outlook promising for record-breaking year.

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. . . Railroad and export buying in prospect.

TORONTO, Jan. 19.—Officials of Canadian steel companies and associated industries are looking forward to a record-breaking year. New business is improving rapidly and most companies now are well supplied with orders which assure continuous operations for several months. In addition there are substantial contracts pending from domestic sources as well as for export. Canadian railroads are expected to be responsible for more than $25,000,000 in new contracts for rails, track supplies and rolling stock, while at the same time large orders are pending from Great Britain and the British Dominions. There has been improvement in buying from the automotive and mining industries recently, while various industrial concerns using iron or steel as raw materials have been more prominent in the market.

Demand for pig iron, both in the Toronto and Montreal districts has increased recently and there is a good call for foundry and malleable grades. Sales in the past week exceeded 1200 tons, of which some 400 tons was malleable. Melters are showing more interest in the market and forward delivery contract placing for first quarter reached the highest level since 1929. Pig iron production is holding at about the level of December or approximately 55 per cent of total Canadian capacity. Imports are negligible, confined chiefly to small lots from the United States. Prices are firm with prospects for higher levels soon, following the upswing in some lines of steel.

Trading in iron and steel scrap is increasing; local dealers report a good market for both iron and steel grades.

C. R. Burt Sees in Machine Tools a Means of Stabilizing Prosperity

COMMENTING on the large volume of machine tool business booked in December, C. R. Burt, president of the National Machine Tool Builders' Association and president of the Niles-Bement-Pond Co., said that "it is due in large part to a realization on the part of machine tool users that higher taxes, higher material costs and higher wages constitute a threat to continued good business and employment opportunities unless some means are found to offset them. The means lies in the use of improved materials and the latest developments in machinery and methods.

"The most important contribution which the machine tool industry will be called upon to make during 1937," said Mr. Burt, "is the progressive reduction of processing costs. In the past it has been axiomatic that higher wages or high priced materials, or rising taxes, or any combination of them, usher in a spiral of pyramiding costs and higher prices until the latter outrun buying power. Then production recedes, choked off by the rising prices that gave it impulse at the beginning of a recovery, and employment necessarily decreases. If that sequence is to be avoided in the present prosperity, some means must be found to keep the rising costs of foods, clothing, shelter and all the goods that go into the homes of one hundred and twenty million people in balance with the latter's capacity and will to buy.

"Insofar as the cost of goods per piece or per unit of production can be lowered or held down by the introduction and efficient use of machinery in mass production and distribution, the higher wages and salaries justified by such economies will be translated into an actual increase in purchasing power. Likewise, insofar as prices are kept in relation to purchasing power by reason of the same savings effected by efficient processing and distributing machinery, sellers of consumer goods will be able to retain wider markets for their products. Instead of a cost and price spiral we then will have a spiral of steadily increasing employment and higher and higher living standards.

"In the trend toward a thoroughgoing modernization of the country's equipment resources, such as is evidenced by the encouraging volume of machine tools purchased in December, lies the means of stabilizing prosperity and employment opportunities throughout the country for a prolonged period."

. . PHILADELPHIA . .

. . . New business coming in at a normal rate.

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. . . Automobile strike has had little effect in this district.

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. . . Operations unchanged at 56½ per cent of capacity.

PHILADELPHIA, Jan. 19.—New business continues to come in at the rate of the first two weeks in the month and is being termed normal for this time of the year by nearly all sales offices. The anticipated letdown in business following the heavy buying in December has been much less than expected. Hold-ups in steel orders because of the General Motors strike have been slight, only one or two cases being reported in this district. The Edward G. Budd Mfg. Co. has been forced to stop shipments completely on Chevrolet passenger car frames, and partially on truck frames. It is continuing to make some frames for passenger cars, however, and is storing them against the time when the strike difficulties will be settled. The Heintz Mfg. Co. has been given stop orders on some Chevrolet requirements.

A strike which lasted for two weeks in the plant of the Carbon Malleable Castings Co., Inc., Lancaster, Pa., was settled last week, the men returning to work on Monday. About 100 men were out and, while the terms of the agreement were not revealed, it is understood that they did not include recognition of the union. The strike at the Electric Storage Battery Co., Philadelphia, continues, the workers still occupying the plant.

Warehouse business this month has been surprisingly good, and in some cases the letdown in orders from December has been scarcely noticeable. Demand seems to be general. Jobbers are receiving shipments of steel for their stock constantly, but some report a decrease in inventories owing to the rapidity with which supplies are being demanded by customers.

Pig Iron

Current buying is light, although foundries are operating almost at capacity. Requisitions on old contracts are being received by sellers regularly, and shipments are heavy. Japan is understood to have made an additional purchase of a comparatively small tonnage from an Eastern steel company, and is said to be anxious to buy more. Sellers here do not believe another price advance is likely in the near future. The ratio of pig iron to scrap being used in open hearth charges may be increased shortly in many plants if the rising scrap market continues.

Sheets and Plates

Sheets are obtainable from some mills in from three to four weeks, but in most cases delivery is impossible in this quarter. One mill, being filled with flat-rolled tonnage for the remainder of the quarter, is accepting no business at all. Backlogs in plates average about two weeks, with specifications from identified contracts accounting for a large share of the incoming business. Before the end of the month a great deal of additional tonnage is expected to be placed for specific jobs. The end of the shipping strike, which appears imminent at this writing, will release a good-sized tonnage of plates from this district to West Coast customers, who have been unable to secure regular water shipments since the beginning of the strike. Pipe is currently in good demand.

Shapes and Bars

Structural shapes may be secured from mills in about two weeks, while bars are running from six to eight weeks for delivery. Bethlehem Steel Co. was awarded contracts for 335 tons of shapes for highway work near Tuckahoe, N. J., and 180 tons for an airplane factory at Dover, Del. A duPont building at Carney's Point, N. J., requiring about 135 tons, went to Belmont Iron Works. No outstanding structural projects were reported out for inquiry. Bids will be taken Friday on 135 tons of reinforcing bars for highway work in Lebanon County, Pa. No important reinforcing steel jobs were reported and nothing of any size is pending.

Imports

The following iron and steel imports were received here during the past week: 2826 tons of iron ore from Persia; 4034 tons of chrome ore from Portuguese Africa; 492 tons of chrome ore from South Africa; 1800 tons of pig iron from British India; 1392 tons of pig iron from the Netherlands; 53 tons of cold drawn steel wire from Sweden; 42 tons of steel bars and 80 tons of structural shapes from Belgium, and 2 tons of ferrotitanium from England.

. . BIRMINGHAM . .

. . . Steel output gains; new business good.

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. . . Mills operating at high rates on backlogs.

BIRMINGHAM, Jan. 19.—Steel production has been increased this week. Eighteen open hearths are in operation, as compared with 17 last week and 16 the previous week. With two brief exceptions in 1933, this is the largest number since June, 1930. Pig iron production is steady, with 15 furnaces in blast.

New steel tonnage is better than expected, in view of the heavy buying last quarter. The mills are all operating at high rates to reduce backlogs.

With most of the foundries already covered for the present, pig iron buying is limited and confined to small, scattered orders. All furnaces have large bookings for this quarter. One company is practically out of the market for the next month or so.

The cast iron pipe market is in the midst of the customary seasonal let-down, which has also been affected by the maritime strike. Birmingham plants have several thousand tons of pipe in their yards, which cannot be moved because of the shipping tie-up. Production has also been curtailed to

some extent by it, and considerable business has been lost. There have been fewer lettings this month, on account of the weather, and the situation is not expected to change much before March.

A renewal of the strike at the ore mines of the Tennessee Coal, Iron & Railroad Co. is pending. The strike, which began June 1 against the company's "incentive" wage plan, was suspended Aug. 4, when an agreement was reached for a trial period of four months, during which a committee appointed by the Governor, the unions and the company would study the situation. This committee held various hearings but did not settle the matter. The strike question was reopened by the miners last week, but an adjustment was not agreed on.

Hardie-Tynes Mfg. Co. is building an addition, 60 x 120 ft., of steel construction, for an erection shop.

Ingalls Iron Works has completed delivery of 22 crest gates for the raising of Lock 17, on the Warrior River, in Alabama. Ingalls also expects to start delivery soon on its structural order for the new Kress building in Birmingham, which will require more than 900 tons.

Operations were resumed last week at the plant of the American Casting Co., Birmingham, after a strike lasting several weeks, which began as a "sit-down" strike.

Gulf States Steel Co. has not yet announced plans for proposed improvements at its Gadsden works, authorized by stockholders in October.

. . . Missouri Pacific inquiries for 2225 freight cars.

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. . . Mississippi River bridge to take 7000 tons.

ST. LOUIS, Jan. 19.—Plans for financing a bridge across the Mississippi River having been approved by the East St. Louis (Ill.) City Council, it is expected that the structure will be ready for bids the latter part of March. It is estimated that between 7000 and 8000 tons of structural shapes will be required.

Missouri Pacific has issued an inquiry for 2225 freight cars, including 1000 box cars, 700 gondolas, 500 hoppers and 25 cabooses, to add to the already heavy inquiries for railroad equipment.

Because of the sold-up condition of mills on sheets, warehouses are doing a heavy trade in this item. Mills are receiving specifications on sheets well into the second quarter. Highway projects are at low ebb, following a change in State administration.

Sales of pig iron consist of small lots for fill-in purposes, nearly all melters having covered their requirements for the first quarter before the recent price advance. Shipments are heavy. The melt in nearly all lines is back to the peak point of early December.

. . . Sheet production at capacity level.

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. . . Household equipment makers are large users.

CINCINNATI, Jan. 19.—Sheet steel demand continues strong, although sources have shifted slightly as a result of labor trouble in the Detroit district. Current bookings, especially from household equipment manufacturers, are near capacity. Readjustment of rolling schedules as a result of slower automobile specifications has not changed the 100 per cent production rate. Of course, earlier rollings have been made possible on some items, but with the return of motor car builders to the market, the problem will again become highly complicated. The leading district interest reports capacity operations with backlogs assuring the present rate well into March.

Pig iron melters are interested only in urgent needs. Current business is averaging about 1200 tons a week. Shipments on contracts are at about the fourth quarter average with no holdups. Foundries adhere to production about 80 per cent of capacity. The automobile strike has not affected the local market to any appreciable degree.

Warehouse business is stimulated by the mill delivery problems. First quarter business is at encouraging levels.

Conway, N. H., has awarded 10,000 to 18,000 ft. of 6-in. to Warren Foundry & Pipe Co.

Treasury Department has awarded 200 tons of pipe for Boston, Worcester and Haverhill, Mass., projects to Warren Foundry & Pipe Co.

Augusta, Me., has awarded 105 tons of 6-in. to United States Pipe & Foundry Co.

Medford, Mass., has contracted with Warren Foundry & Pipe Co. for its 1937 pipe requirements.

Montgomery, Ala., closes bids Jan. 26 for about 12 miles of pipe for water system, including 24-in. for main line, and other lines from 6 to 14-in.; also for pumping equipment and accessories. Billingsley Engineering Co., Interstate Bank Building, New Orleans, is consulting engineer.

Eldorado, Kan., will take bids soon for pipe for water system; also for elevated steel tank and tower and other waterworks equipment. Cost about $50,000 of fund of $120,000 arranged for water development and supply. Paulette & Wilson, National Reserve Building, Topeka, Kan., and Farmers' Union Building, Salina, Kan., are consulting engineers.

Fall Creek, Wis., plans pipe lines for water system and other waterworks installation. Cost about $52,000. Financing is being arranged through Federal aid and bond issue. Druar & Milinowski, Globe Building, St. Paul, Minn., are consulting engineers.

Alderwood Water District, Alderwood Manor, Snohomish County, Wash., plans about 31 miles of 2 to 8-in. for water system; also two 50,000-gal. steel storage tanks and other waterworks equipment. Cost about $203,000. Financing is being arranged through Federal aid. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Nettleton, Ark., plans pipe lines for water system and other waterworks installation. Cost about $45,000. A bond issue is being arranged. P. S. Ferris, mayor, is in charge.

New Washington, Ohio, will take bids soon for about 35,000 ft. of 2 to 8-in. for water system; also for 100,000-gal. steel water tank, and other waterworks installation. Cost about $82,000. Jennings & Lawrence, 12 North Third Street, Columbus, Ohio, are consulting engineers.

Little Rock, Ark., plans purchase of pipe for extensions and replacements in water system; also equipment to increase capacity of water filtration plant from 8,000,000 to 12,000,000 gal., entire project to cost $135,000. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Vermillion, Kan., closes bids Jan. 28 for 26,360 ft. of 6 in., 11,740 ft. of 4 in. and 1910 ft. of 2 in.; also for about 5.3 tons of fittings, 50,000-gal. elevated steel tank and tower, valves and miscellaneous equipment. Paulette & Wilson, National Reserve Building, Topeka, Kan., and Farmers' Union Building, Salina, Kan., are consulting engineers.

Bountiful, Utah., has awarded 212 tons of 2 to 8-in. to Pacific States Cast Iron Pipe Co.

Oakland, Cal., will open bids Jan. 20 on 128 tons of various sizes.

. . . CLEVELAND . . .

. . . With large backlogs, steel industry feels little effect from automobile strikes.

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. . . Production stepped up as new business develops in good volume.

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. . . Sheet mills filled up for first quarter, with some orders booked for April.

CLEVELAND, Jan. 19.—Steel production increased this week, indicating that with the heavy demand from other sources and good backlogs, the industry is feeling little effect of the General Motors strike.

Ingot output in the Cleveland-Lorain district is at 79 per cent of capacity this week, having recovered the three point loss of the previous week. In the Youngstown district output gained two points to 77 per cent of capacity. To supplement its present steel-making capacity, the Republic Steel Corp. is considering the rehabilitation of the five open hearth furnaces at its Upson plant in Cleveland, which have been idle since 1929.

The volume of new business in finished steel at first quarter prices is being well maintained. The new tonnage of sheets equals shipments so that there is no reduction in backlogs. There is still pressure for sheet deliveries. Several of the sheet mills are now filled up for the first quarter and some tonnage has been taken for shipment at the mills' convenience which cannot be produced until April. New orders for strip steel in sizable lots were placed during the week by some of the motor car manufacturers. However, shipments of some hot strip are being held up by non-integrated cold rolling mills. New business in steel bars with some mills is holding up to shipments, but with others is falling very little behind production. Consumers in the automotive field, aside from general motors plants and including parts makers in this territory, are taking large shipments of sheets and the demand from diversified industries is surprisingly heavy. With deliveries far extended, sheet consumers are looking out for their requirements for some time in the future and many evidently wish to avoid the possibility of not securing deliveries as wanted when the termination of the General Motors strike results in the release of large tonnages.

Structural steel and plates continue in good demand. With considerable grade crossing elimination work in prospect, the outlook is good in the construction field.

Pig Iron

Quite a few sales are being made in lots up to 200 tons at the new $21 price. Shipments are good to all consumers except to some foundries making General Motors parts, which have held up deliveries. Foundries making machine tools, heating equipment, railroad equipment and agricultural implements are very busy and are taking iron in good quantities. Steel foundries are also quite busy. Much of the iron shipped recently is against $19.50 contracts, which will be about cleaned up by Feb. 1.

Bars, Plates and Shapes

With a good demand from diversified industries as well as from automobile parts makers having orders from other than General Motors plants, the volume of business in merchant bars continues good. However, some shipments of alloy bars are being held up. Mills are getting releases of considerable tonnage in structural shapes for recently placed fabricated work. New structural awards include 715 tons for a power plant in Cincinnati for a utilities company placed with the Mount Vernon Bridge Co. and 1040 tons for buildings for the National Carbon Co. in Columbia, Tenn., placed with the Bethlehem Steel Co., this supplementing a 1100-ton award by the same company reported last week. Plates are moving well in small lots.

Sheets

New business in good volume continues to come from diversified industries and, with pressure for deliveries by consumers in other fields, mill operations have scarcely been affected by the hold-up of shipments to General Motors plant. Shipments are heavy to makers of household equipment, and railroads are ordering freely. The volume of new business is equal to shipments, this being indicated by the fact that mills are not gaining on deliveries. Some mills now have orders for about all the sheets they can produce through the first quarter and on mill has taken some tonnage that it will not be able to ship before April.

Strip Steel

Orders for sizable lots were placed during the week by motor car manufacturers, some of whom are believed to be building up stocks so that they will have a good supply should releases, when General Motors plants resume, tighten up deliveries. Considerable tonnage of hot strip has been held up by non-integrated cold rolling mills and both hot and cold material by automobile parts makers. Mills, however, still have fair backlogs.

Iron Ore

Consumption of Lake Superior ore during 1936 was 44,639,318 tons, the largest since 1930, when 45,192,000 tons was consumed. In 1935, 30,848,179 tons was consumed and in 1934 21,113,951 tons. Ore melted in December was 4,551,379 tons, a gain of 262,987 tons over November. Furnace stocks Jan. 1 were 27,022,495 tons, a gain of 774,276 tons over the same date a year ago. There were 142 furnaces in blast using Lake ore Jan. 1, a gain of two for the month.

Lewis Foundry & Machine Co., a subsidiary of the Blaw-Knox Co., has received an order from Domnarfvets Steel Works, Domnarfvets, Sweden, for a three-high mill, complete with automatic feeder and catcher tables, furnace run out table, and gear drive. The order was placed through Canada Iron Foundries, Ltd.

New Pricing Plan For Scrap

(CONTINUED FROM PAGE 71)

Metal Co., Toledo, Ohio, voiced a similar complaint. He said: "Competition is keener now than I have ever seen it. Wealthy brokers at the present time are attempting to consume all the business—by opening offices in industrial cities and by sending traveling men to every little village or town that has a smokestack, paying more than they are offering to the dealers. . . . Surely the large brokers are sensible enough to see that they are trying to swallow just a little more than they can digest well."

Norman Franklin, of the Jackson Iron & Metal Co., Jackson, Mich., president of the Michigan chapter, also dwelt on "cut-throat competition." "It is not my desire to single out anyone, nor is it within my power to try to tell anybody else how to run his business," said Mr. Franklin. "However, as president of the Michigan chapter it has been brought to my attention that all is not as it should be 'along the Potomac' at times. . . . Roughly, there are well over 100,000 tons of scrap handled through dealers and brokers in Michigan each month. How much of that is handled at a profit is open to debate. I understand in the Detroit district alone there are various dealers and brokers that are sometimes at odds with each other. The matter of price in quoting on material, or profits on any transactions, apparently sometimes does not enter into the picture. . . . We are servicing a great steel industry, and it is to our direct benefit to service this industry in a manner not open to any criticism. It is also to our interest in servicing the producers of scrap, in addition to the service we render, to pay them the market price for scrap. If scrap is worth $10 a ton f. o. b. Detroit or Jackson, the producers do not want any less for their commodity, and, by the same token, certainly cannot expect more than the market price. On the other hand, if producers' scrap is worth $10 a ton, the mill that we are servicing should get this scrap at a cost of $10 per ton, plus our dealer's or broker's commission. Any deviation therefrom can only end disastrously."

Causes for Rejections

Joseph E. Jacobson, of Luria Brothers & Co,. Pittsburgh, president of the Pittsburgh chapter, discussed rejections and the losses that are caused by "1. Deception and deliberate misrepresentation; 2. Lack of knowledge of mill specifications; 3. Lack of knowledge of what a mill will accept as a good substitute delivery; 4. Lack of cooperation between the mill, the broker and the dealer." He stated that rejections can be greatly reduced and losses avoided by better cooperation and frequent exchange of ideas so that there will be a clearer understanding as to what is a good delivery.

In the St. Louis district, said Jack R. Forcheimer, president of the St. Louis chapter, the dealers have convinced the mills and foundries of their sincerity, and the chapter officers have been called in to iron out disputes with shippers. A grading committee investigates each complaint of the steel mill and never fails, according to Mr. Forcheimer, in obtaining the cooperation of the shippers in loading scrap that complies with specifications. He added that complaints of shippers of rejections by the mills have been adjusted through cooperation of the mills with the grading committee when the complaints have been found to be justified.

Claims Scrap Rates Are Too High And Inequitable

Complaint of the alleged unfair freight rate burden on scrap as compared with pig iron was made by D. Sloan Hurwitz, of Hurwitz Brothers Iron & Metal Co., Buffalo, president of the Buffalo chapter. He said that pig iron enjoys rates 10 per cent lower than scrap, adding that in recent years trucks and barges have been getting a good deal of the scrap transporting business where railroads have refused to put in reasonable rates. He suggested the raising of minimum carload requirements from 44,800 lb. to 56,000 lb. as one means of assuring the railroads a fair load and thereby paving the way to lower scrap rates. He cited the rate of $2.39 from Syracuse to Buffalo, while from Cortland, N. Y., 36 miles nearer to Buffalo than Syracuse, the rate is 89c. a ton higher, and Binghampton, 90 miles nearer, Buffalo, has a rate 76c. higher. He urged that the institute appoint a committee to work with the carriers for lower and more equitable rates.

Louis J. Borinstein, of A. Borenstein, Indianapolis, Ind., chairman of the institute's legislative committee, discussed the various Federal legislative enactments and proposed laws that are having or will have an effect on business.

Others who spoke are: Joseph A. Moskowitz of Samuel Sons Iron & Steel Co., Brooklyn, president of the New York chapter; M. D. Friedman of the company of the same name, Ashland, Ky., president of the Cincinnati chapter; Arthur R. Robinson of R. L. Batteiger Co., Philadelphia, president of the Philadelphia chapter, and Abe Cohen, of Lynchburg Iron & Metal Co., Lynchburg, Va., president of the Southern chapter.

New Officers And Directors

The following officers were elected for the year 1937: President, Darwin S. Luntz, Luntz Iron & Steel Co., Canton, Ohio; vice-president, Michael V. Bonomo, Schiavone-Bonomo Corp., New York; secretary, Walter Erman, Erman-Howell & Co., Inc., Chicago; executive secretary, Benjamin Schwartz, New York.

The new board of directors, in addition to the above, elected at the convention, will consist of the following: Arthur M. Price, Price-Watson Co., Chicago; Sam Kasle, Kasle Iron & Metal Co., Toledo, Ohio; Norman Franklin, Jackson Iron & Metal Co., Jackson, Mich.; Arthur J. Reichman, Reichman & Hoffman Brothers, Newark; Joseph A. Moskowitz, Samuel Sons Iron & Steel Co., Inc., Brooklyn; Joseph E. Jacobson, Luria Brothers & Co., Inc., Pittsburgh; Jack R. Forcheimwer, St. Louis; Milton Levenson, Roxbury Iron & Metal Co., Dorchester, Mass.; A. R. Robinson, R. L. Batteiger Co., Philadelphia; Joel Claster, Luria Brothers & Co., Inc., Philadelphia; William J. Ross, Hyman-Michaels Co., Chicago; Philip W. Frieder, Philip W. Frieder Co., Cleveland; Louis J. Borinstein, of A. Borinstein, Indianapolis; David Pollock, of Mayer Pollock, Pottstown, Pa.; Frank Contey, Frank Contey, Inc., Jersey City, N. J.; D. Sloan Hurwitz, Hurwitz Brothers Iron & Metal Co., Buffalo; Maurice D. Friedman, M. D. Friedman Co., Ashland, Ky.; Abe Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va.

Pittsburgh Crucible Fire Damage Slight

DAMAGE to the tin mill of the Pittsburgh Crucible Steel Co., Midland, Pa., due to a fire last week is estimated by officials to be under $100,000. Rolling mill equipment was unaffected and was in operation 24 hours later. Pickling tanks and tinning machinery were damaged and will be replaced as soon as possible.

. . . . NEW YORK. . . .

. . . Sheet orders booked for April with market price then existing to be paid.

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. . . Steel business generally at good level, considering large December business.

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. . . Tin plate specifications heavy; demand for oil-country pipe gaining.

NEW YORK, Jan. 19.—One of the striking features of the current market is the persistent pressure upon the mills to accept further orders for sheets, although most of them are already booked to capacity throughout the remainder of the quarter. As a result of this pressure, mills have been forced to accept orders that cannot be shipped earlier than April, in such cases the customer agreeing to pay the market price ruling at the time of shipment. If suspended automobile tonnage, which will be promptly released upon settlement of the strikes, is included, the sheet manufacturers as a group have sufficient business to run their mills at practical capacity through April at least, as it now appears certain that existing backlogs cannot possibly be completed during the present quarter.

The heaviest bookings at the moment, however, are in shapes and plates for identified building projects, and specifications for railroad equipment, in oil country pipe and in tin plate. Concrete bar distributers are taking fairly large quantities of bars for stock. While business in merchant pipe has shown no marked improvement, the demand from oil companies has been steadily getting better for some weeks. A part of this demand may be inspired by the expectation of higher prices for second quarter. A feature of current tin plate specifications is the large amount being taken for beer and oil cans.

Taken altogether, the demand for finished steel is not anywhere near the heavy volume of December, but is considered by mills as highly satisfactory. Some mills making the heavy products have booked more tonnage this month than they have shipped.

Pig Iron

Orders are in smaller aggregate volume, and some slackening in shipments is reported by one or two sellers. Most consumers are well covered on estimated forward needs. The market may continue quiet for a period, but buyer interest should normally reappear by the beginning of March. The district's consumption, as indicated by the melt at jobbing foundries, continues unchanged. An inquiry from Holland for 600 tons of hematite iron and 600 tons of ordinary foundry grade aroused interest here last week, though sellers doubt that business will result.

Reinforcing Steel

The price situation, which was thought to have improved, is as bad as ever, according to sellers in this district. While it is true that there have been but few real tests of the present price, the fact remains that awards have been made on both public and private lettings as a result of bids $10 and $12 under the published price. Recent activity has been light, but pending jobs hold promise of some fairly large tonnages. The Midtown Hudson Tunnel will advertise for bids on bars early in February, and bids are now being readvertised on some contracts for World's Fair construction. A large plant for Swift & Co., in Newark, which has not yet entered the construction stage, will probably require a large amount of bars.

Cast Iron Pipe

Pending business in cast pipe is limited to two identified projects, one at Syracuse, N. Y., involving 2500 ft. of 24 in. pipe, approximately 210 tons, for the city's Bureau of Water. Bids were taken Jan. 18. The other project involves 11,000 ft. of 16 in. pipe, approximately 600 tons, advertised by Public Service Gas & Electric Co., Newark, N. J. Bids in the latter instance were also taken Jan. 18. While outlet for material in this district has not been large over recent weeks, prices continue firm.

.GREAT BRITAIN. .

. . . Output of 11,698,000 tons in 1936 a record.

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. . . Further price advances on European steel.

LONDON, Jan. 19 (*By Cable*).—The British 1936 steel output of 11,698,000 tons was an all-time record. Producers are concentrating on further expansion as armament activity is not yet at peak and other home and export demands are growing.

Pig iron consumers are receiving sufficient shipments to maintain operations, but there is no surplus for stock and makers are reluctant to book fresh business. Steel consumers have covered requirements for many months ahead, but are still anxious to place new business. The pressure for deliveries against contracts was increased by the announcement that undelivered balances on June 1 will be charged at prices then ruling.

British and Continental prices on black sheets were raised 10s., and on galvanized sheets 20s. sterling to take effect immediately.

Continental gold export prices on plates, thick sheets and flat billets were raised 7s.6d. The price on ship plates was raised 40s. sterling.

. . . BOSTON . . .

. . . Electrical manufacturers extremely busy.

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. . . General foundry trade is active.

BOSTON, Jan. 19.—The pig iron market has become quiet again. Foundries that intimated a week ago they would be in the market for iron apparently decided to defer purchases until the automobile labor situation is cleared up. The general foundry situation, however, is quite strong and pig iron is being consumed faster than melters anticipated. Many foundries are stepping up prices for castings.

Electrical appliance manufacture is the brightest spot in the New England industrial situation. The important companies have more business on their books than at any time in the past seven years, and sufficient to keep them going at current rate of production well into the second half.

Furnace representatives and coke makers say collections never were better, those for coke being especially good. Foundries by paying for coke within 10 days are permitted to deduct 15c a ton.

RAILROAD BUYING

Aluminum Co. of Canada is inquiring for one 2-8-2 type locomotive.

Guayaquil & Quito has ordered two 2-8-0 type locomotives from Baldwin Locomotive Works. J. Leimberger is superintendent of motive power at Huigra, Ecuador.

Missouri Pacific is inquiring for four 600-hp. and two 900-hp. diesel switching engines.

Illinois Terminal is in the market for 50 flat cars and 100 gondola cars.

North American Car Corp. is inquiring for 200 40-ton refrigerator cars.

Chicago Great Western has ordered 200 70-ton hopper cars from Pullman-Standard Car Mfg. Co.

Trustees of New York, New Haven & Hartford have applied for permission to purchase 50 light weight air-conditioned passenger coaches costing about $40,000 each, and five cafeteria cars costing about $45,000 each.

Bangor & Aroostook has purchased five de luxe coaches and two baggage-mail cars from the Pullman-Standard Car Mfg. Co.

Missouri Pacific is inquiring for 1000 box cars, 700 gondola cars, 500 hopper cars and 25 cabooses.

Pennsylvania Railroad has completed construction of 10,000 freight cars in its own shops and is in process of scrapping 32,000 old cars. New cars include 3000 automobile, 4700 box, 2000 mill type gondolas for handling long structural shapes and pipe, and 300 weatherproof cars for cement, lime and similar bulk commodities.

Milwaukee Road will buy 2000 freight cars.

Chicago Rapid Transit is in the market for 600 passenger trailers.

Trustees of Western Pacific have applied for authority to issue $2,320,000 in equipment trust certificates to purchase 11 locomotives and 350 freight cars, costing $2,915,927, from the following car and locomotive builders: Seven locomotives, American Locomotive Co.; four locomotives Baldwin Locomotive Works; 200 steel-sheathed box cars, Mount Vernon Car Mfg. Co., Mount Vernon, Ill.; 100 hopper cars, Rodger Ballast Car Co., St. Louis; 50 steel underframe flat cars, Pacific Car & Foundry Co., Portland, Ore.

American Car & Foundry Motors Co. has received an order from Eastern Massachusetts Street Railway Co., Boston, for 45 motor coaches, powered with Hall-Scott horizontal engines. This is the 19th repeat order from this company.

. . SAN FRANCISCO . .

. . . Activity greater in structural steel.

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. . . Construction gains expected in Pacific Northwest.

SAN FRANCISCO, Jan. 18.—Activity in Pacific Coast steel markets last week was greater than at any time during the past two months. Aggregate awards of 8435 tons of structural steel led the spurt, with reinforcing bar awards totaling 2748 tons. Judson-Pacific Co. was awarded 900 tons of structural shapes in two jobs, 500 in the Feather River bridge near Nicolaus, Cal., and 400 tons in buildings for the Bay Bridge Exposition at San Francisco.

Several projects involving sizable structural steel tonnages were announced. At Sacramento, Cal., bids will be opened about March 1 on 6000 tons of shapes to be used in the construction of Government buildings. The North American Aviation Co. at Inglewood, Cal., has opened bids on 1000 tons for construction of new buildings, and the Southern Pacific will open bids soon on 720 tons required in the construction of 10 bridges. Opening of bids on 520 tons of bars for the construction of the Lyon Street approach for the Golden Gate Bridge led the list of new reinforcing projects.

Great optimism for the coming year has been expressed by steel organizations in the Pacific Northwest, 1936 having set an all-time high in construction work. Though strike conditions have slowed work, indications are that building will be even greater this year. Companies all along the Coast are preparing for a heavy steel demand when amicable relations are again brought about on the maritime front.

. . . . BUFFALO . . . .

. . . Open hearth activity is stepped up.

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. . . Further production gain is expected.

BUFFALO, Jan. 19—Open hearth furnace activity has now reached 33 units. At Bethlehem's Lackawanna plant 25 furnaces are active, including two of the new No. 3 battery. By the end of the week one more may be in operation, bringing the Bethlehem total to 26. Republic Steel Corp. continues to operate six and Wickwire-Spencer Steel Co. two.

Bids for State highway bridges were to be opened today. A Tompkins County job will require 160 tons and a Delaware County job 290 tons of structural steel. Thomas C. Brown of Schenectady is general contractor for the Geneseo Normal School, which will require 420 tons of shapes. Plans will be out about the end of January for the new Erie County jail, which will require 600 or 700 tons of structural, and a considerable tonnage of reinforcing bars.

Bids went in Monday for the Rochester incinerator job to take 130 tons of reinforcing bars. Geneseo Normal will require nearly 100 tons of reinforcing. O'Connell Electric Co., Rochester, is the general contractor for the sewage treatment plant at Sonyea, N. Y., which will require 116 tons of reinforcing bars.

Orders received by the General Electric Co. during 1936 amounted to $296,748,219, compared with $217,361,587 during 1935, an increase of 37 per cent, President Gerard Swope has announced.

. . .NON-FERROUS. . .

. . . Domestic copper raised to 13c. level; December statistics influence foreign price reaction.

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. . . Lead and zinc less active, as London market eases.

NEW YORK, Jan. 19—Domestic copper prices took another spurt last week, the market, as based on electrolytic grade, having moved up ½c. on Jan. 14 to 13.00c. a lb., Connecticut Valley. Producers were forced to make the advance by reason of a higher London market. Since then, however, the situation has changed considerably, and with prices in London weakening, pressure here is disappearing. Producers continue to quote 13.00c. on all business, but demand has quieted. Trading in the export market is less active, with the price today at about 12.27½c., European ports. Total domestic sales through yesterday were 39,336 tons. December statistics, which were bearish as to foreign developments, influenced events in London. Figures for the domestic trade were buoyant, however. Domestic apparent consumption of refined copper in December, as indicated by shipments, rose 15,030 tons to 82,409 tons, production was up 10,147 tons to 78,829 tons, and stocks went down 10,247 tons to 161,044 tons at Dec. 31. Total world refined stocks remained about unchanged as a consequence of foreign increases.

The Week's Prices. Cents Per Pound for Early Delivery

	Jan. 13	Jan. 14	Jan. 15	Jan. 16	Jan. 18	Jan. 19
Electrolytic copper, Conn.*	12.50	13.00	13.00	13.00	13.00	13.00
Lake copper, N. Y.	12.62½	13.12½	13.12½	13.12½	13.12½	13.12½
Straits tin, spot, New York	50.95	51.15	51.50	....	51.37½	51.00
Zinc, East St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 17.00c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.25c. a lb., New York.
Quicksilver, $88.50 to $92.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 13.75c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	52.00c. to 53.00c.
Tin, bar	54.00c. to 55.00c.
Copper, Lake	13.75c. to 14.75c.
Copper, electrolytic	13.75c. to 14.75c.
Copper, castings	13.00c. to 14.00c.
*Copper sheets, hot-rolled	20.37½c.
High brass sheets	18.25c.
*Seamless brass tubes	20.87½c.
*Seamless copper tubes	21.37½c.
*Brass rods	16.12½c.
Zinc, slabs	7.00c. to 8.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.75c.
Lead, American pig	7.00c. to 8.00c.
Lead, bar	8.00c. to 9.00c.
Lead, sheets, cut	8.75c.
Antimony, Asiatic	15.00c. to 16.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	31.50c. to 32.50c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

* These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.50c.
Tin, bar	57.50c.
Copper, Lake	14.12½c. to 14.25c.
Copper, electrolytic	14.12½c. to 14.25c.
Copper, castings	13.87½c. to 14.00c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig	6.50c. to 6.60c.
Lead, bar	9.25c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade	21.50c.
Babbitt metal, high grade	59.50c.
Solder, ½ and ½	33.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.75c.	10.50c.
Copper, hvy. and wire	9.62½c.	10.12½c.
Copper, light and bottoms	8.62½c.	9.12½c.
Brass, heavy	6.12½c.	6.75c.
Brass, light	5.25c.	6.00c.
Hvy. machine composition	9.00c.	9.50c.
No. 1 yel. brass turnings	7.37½c.	7.87½c.
No. 1 red brass or compos. turnings	8.62½c.	9.12½c.
Lead, heavy	5.00c.	5.37½c.
Sheet aluminum	13.25c.	14.75c.
Zinc	3.00c.	3.37½c.
Cast aluminum	12.12½c.	13.25c.

Lead

Domestic lead sales were in fair volume last week, but, as this week has opened, prices in London have fallen off considerably, and buyers here have consequently withdrawn from the market. The lull in activity has not caused domestic quotations to weaken, however, and pig lead remains quotable at 5.85c. a lb., St. Louis, and 6.00c., New York. Consumers have covered against approximately 50 per cent of estimated February requirements, while January needs are about 90 per cent filled.

Zinc

Sales of spelter aggregated 9800 tons last week at prices ranging from 5.62½c. a lb., East St. Louis, to the existing market basis of 6.00c. Shipments bordered on 6200 tons. Buying was stimulated by price advances, as earlier announced. Currently demand is quiet, the market in London has weakened and less buoyant condition prevail generally. Some speculative metal is being offered for resale at less than producer quotations. Legitimate interests assert, however, that consumers are so well represented on the industry's order books that a market for tonnage even at a concession hardly exists. Fundamentally, the market's position continues sound despite minor disturbances, and producer quotations, as based on 6.00c., East St. Louis, apply firmly on all first half-year business. Ore and concentrate quotations were recently advanced to $38 and $39 a ton.

Tin

While little change is reported for this market in which trading has been inactive for several weeks, some added uncertainty has recently cropped out owing to the automobile strike. Prices are moderately off from a week ago, spot Straits at New York selling today for 51.00c. a lb., and standards in London this morning quotable at £229 10s. prompt and £230 futures. The Eastern price was £232 2s. 6d. The Navy Department has purchased 30,000 lb. of tin for use at the Brooklyn Navy Yard, the price paid having been 51.50c. a lb.

IRON AND STEEL SCRAP

. . . Composite price increases 25c. to $18.42 a gross ton.

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. . . Automobile strike and export in East are important market factors.

THE automobile strike and the export of scrap from the Eastern seaboard are the two factors attracting the most attention in the markets over the country this week. In the West prices have not, as yet, been noticeably affected by the General Motors situation, but brokers and dealers are keeping a close watch on developments in Detroit. Prices in Cleveland eased off 25c. to 50c. a ton due to the absence of new consumer demand and a more plentiful supply of scrap. Detroit, St. Louis and Cincinnati prices are unchanged, while heavy melting steel came to a standstill at Pittsburgh, but advanced 25c. at Chicago and 50c. at Philadelphia, bringing the composite figure to $18.42.

Brokers in nearly all Eastern cities are finding it to their advantage to collect material for export, rather than to ship it to domestic consumers. Heavy steel advanced $1 at Boston and 50c. at New York and Philadelphia. Prices for this grade, however, are nominal in most cases, since mill buying prices are not yet high enough to compete successfully with foreign bids.

Pittsburgh

With a railroad list recently having brought at least $20.50, delivered, for railroad heavy melting and exceptionally large tonnages of No. 1 steel bought at $20 in the past two weeks, the market continues firm and strong despite moderate tonnages reported to have been sold into consumption at less than present quotations. Steel is not coming out too freely and heavy shortages are overhanging the market. The fact that less scrap is coming out of Detroit is being felt to some extent in this district, and for the immediate future at least a high consumption is being maintained, owing to local steel operating rates being at the best level since early 1930. That some reaction may occur in the market if the automobile tie-up continues for a prolonged period is admitted by some brokers. Meanwhile, railroad specialties are scarce and recent sales reflect a dollar increase over previous quotations.

Chicago

Heavy melting steel has moved up 25c. to $18.25 a gross ton, delivered consumers' yards. Shipments are heavy and adequate supplies are hard to find, not because of a real scarcity but because some producers and many dealers are holding tonnages for higher prices.

Cleveland

In the absence of new consumer demand and with the supply somewhat more plentiful prices have eased off 25c. to 50c. a ton on steel—making grades, bringing brokers' prices more in line with the prices they are getting from the mills against outstanding contracts placed some time ago. Brokers report that they are able to buy No. 1 steel at $17 for Cleveland delivery, although $17.50 appears to be the more common price. New activity is also lacking in the Youngstown district. The mild weather recently has made scrap easier to handle and that accounts, at least in part, for the more liberal supply.

Philadelphia

Dealers' buying prices for No. 1 steel for export have increased to $17.25 to $17.50, while No. 2 steel, which is now being accumulated for foreign shipment also, is quoted at $16.25. A boat is expected to begin loading early next month. Pressure from abroad for scrap is reported to be increasing. Meanwhile, domestic consumers are disturbed at the prospect of having to bid against high foreign prices. One district mill is said to have paid $17 for No. 2 steel, while no one knows exactly what No. 1 will bring, although brokers say nothing can be bought today for less than $18. Shipments are lessening and it is becoming apparent that mill buying will soon be necessary. There is a strong possibility that excess stocks of pig iron will be added to charges in the place of scrap, should the market continue to rise. Heavy melting steel is nominally quoted this week at $17.50, the highest since December, 1925, and No. 2 is $16.50 based on sales. Numerous other advances were also made throughout the list.

Detroit

Owing to uncertainties created by the strike situation, scrap prices here have not changed. General Motors offered 200 cars of scrap Monday on an "if and when" basis. It is assumed that the buyer took this scrap to cover a short position as the possibility of delivering any of this material before the end of the month is doubtful as the deadlock continues.

St. Louis

The scrap market was quiet last week, and no sales were made. Prices are unchanged. Lists closing this week include St. Louis-San Francisco, and International-Great Northern railroads, 2000 tons each, and Missouri-Kansas-Texas, 1500 tons.

Cincinnati

Mill refusal to entertain propositions for future commitments is holding the scrap market back. Some small ordering for needs and foundry use has been reported. Dealers' bids are on a par with published schedules, but the undertone remains strong.

Buffalo

Sales of No. 1 steel have been made at $18.50 in Buffalo and at $19 in a nearby district. Another Buffalo mill has paid $17.25 for new hydraulic compressed sheets, which is on a basis of $18.75 for No. 1 steel. Railroad malleable has sold at $18.50 in Buffalo and for $1 per ton higher in the district. Strength is also noticed in No. 1 machinery cast, cupola cast, stove plate and railroad malleable.

Boston

The scrap market has become very largely an export affair. In their scramble to obtain Nos. 1 and 2 steel, exporters have again lifted their offers, this time $1 a ton. They are now paying $15.50 a ton delivered army base for No. 1 steel, the highest price noted in many years. With material scarce, it is quite probable exporters will shortly again raise their bids. Prices for heavy melting steel for Pittsburgh delivery have been raised $1 a ton, but are nominal, because the export market is more profitable for owners of such scrap.

New York

New York dealers have raised their buying price on No. 1 steel for domestic use to $14 a gross ton, an advance of 50c. a ton over previous quotations. No. 2 steel has been lifted 25c. to $12.75, and increases of from 50c. to $1 a ton in other classifications are numerous. With demand very active, transactions are frequent and a strong situation prevails. Although export quotations are unchanged from a week ago, purchases by Italy and Japan continue in volume. England also has come into the market. Cargo loadings for foreign shipments are proceeding daily.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.50 to $20.00
No. 2 hvy. mltng. steel.	17.75 to 18.25
No. 2 RR. wrought	19.50 to 20.00
Scrap rails	20.00 to 20.50
Rails, 3 ft. and under..	22.50 to 23.00
Comp. sheet steel	19.50 to 20.00
Hand. bundled sheets.	18.50 to 19.00
Hvy. steel axle turn...	18.00 to 18.50
Machine shop turn.....	14.00 to 14.50
Short shov. turn.	14.00 to 14.50
Mixed bor. & turn.....	13.50 to 14.00
Cast iron borings	14.00 to 14.50
Cast iron carwheels...	18.00 to 18.50
Hvy. breakable cast....	15.00 to 15.50
No. 1 cast	17.00 to 17.50
RR. knuckles & cplrs..	24.50 to 25.00
Rail coil & leaf springs	24.50 to 25.00
Rolled steel wheels....	24.50 to 25.00
Low phos. billet crops.	25.00 to 25.50
Low phos. sh. bar....	24.50 to 25.00
Low phos. punchings..	24.00 to 24.50
Low phos. plate scrap.	24.00 to 24.50
Steel car axles	23.00 to 23.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.25 to $17.75
No. 2 hvy. mltng. steel.	16.25 to 16.75
Comp. sheet steel	16.50 to 17.00
Light bund. stampings	13.00 to 13.50
Drop forge flashings..	16.50 to 17.00
Machine shop turn.....	12.00 to 12.50
Short shov. turn.	12.00 to 12.50
No. 1 busheling	16.00 to 16.50
Steel axle turnings	15.00 to 15.50
Low phos. billet crops	22.00 to 22.50
Cast iron borings	12.50 to 13.00
Mixed bor. & turn....	12.50 to 13.00
No. 2 busheling	12.50 to 13.00
No. 1 cast	18.50 to 19.00
Railroad grate bars...	12.00 to 12.50
Stove plate	10.00 to 10.50
Rails under 3 ft.	22.00 to 22.50
Rails for rolling	20.00 to 20.50
Railroad malleab'e ...	18.00 to 18.50
Cast iron carwheels....	18.50 to 19.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.50
No. 2 hvy. mltng. steel.	16.50
Hydraulic bund., new.	$16.50 to 17.00
Hydraulic bund., old..	15.00 to 15.50
Steel rails for rolling..	18.00 to 18.50
Cast iron carwheels..	18.50 to 19.00
Hvy. breakable cast ..	17.00 to 17.50
No. 1 cast	18.50 to 19.00
Stove plate (steel wks.)	14.00 to 14.50
Railroad malleable	18.00 to 18.50
Machine shop turn.....	11.00 to 11.50
No. 1 blast furnace....	10.50 to 11.00
Cast borings	10.50 to 11.00
Heavy axle turnings..	15.50 to 16.00
No. 1 low phos. hvy....	21.50 to 22.00
Couplers & knuckles ..	21.50 to 22.00
Rolled steel wheels ...	21.50 to 22.00
Steel axles	21.50 to 22.00
Shafting	22.00 to 22.50
No. 1 RR. wrought....	16.50 to 17.00
Spec. iron & Steel pipe	14.50 to 15.00
Bundled sheets	14.00 to 14.50
No. 1 forge fire.....	15.50 to 16.00
Cast borings (chem.).	12.00 to 13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$17.75 to $18.25
Auto. hvy. mltng. steel.	16.50 to 17.00
Alloy free	16.50 to 17.00
Shoveling steel	17.75 to 18.25
Hydraul. comp. sheets.	17.00 to 17.50
Drop forge flashings..	14.50 to 15.00
No. 1 busheling	16.50 to 17.00
Rolled carwheels	20.00 to 20.50
Railroad tires, cut	20.00 to 20.50
Railroad leaf springs..	20.00 to 20.50
Axle turnings	16.50 to 17.00
Steel coup. & knuckles	19.00 to 19.50
Coil springs	22.00 to 22.50
Axle turn. (elec.)	17.50 to 18.00
Low phos. punchings..	21.75 to 22.25
Low phos. plates, 12 in. and under	21.75 to 22.25
Cast iron borings	10.50 to 11.00
Short shov. turnings..	11.00 to 11.50
Machine shop turn. ...	9.50 to 10.00
Rerolling rails	20.00 to 20.50
Steel rails under 3 ft...	20.00 to 20.50
Steel rails under 2 ft. ..	22.00 to 22.50
Angle bars, steel.....	20.00 to 20.50
Cast iron carwheels ..	18.50 to 19.00
Railroad malleable ...	20.00 to 20.50
Agric. malleable	16.50 to 17.00
	Per Net Ton
Iron car axles	20.50 to 21.00
Steel car axles	$21.50 to $22.00
No. 1 RR. wrought....	16.75 to 17.25
No. 2 RR. wrought....	16.00 to 16.50
No. 2 busheling, old..	6.75 to 7.25
Locomotive tires	17.00 to 17.50
Pipes and flues	11.00 to 11.50
No. 1 machinery cast..	16.00 to 16.50
Clean auto. cast	14.75 to 15.25
No. 1 railroad cast ..	15.00 to 15.50
No. 1 agric. cast	12.50 to 13.00
Stove plate	10.00 to 10.50
Grate bars	11.50 to 12.00
Brake shoes	12.00 to 12.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$18.50 to $19.00
No. 2 hvy. mltng. steel.	16.75 to 17.25
Scrap rails	17.50 to 18.00
New hy. b'ndled sheets	16.75 to 17.25
Old hydraul. bundles ..	13.50 to 14.00
Drop forge flashings ..	16.75 to 17.25
No. 1 busheling	16.75 to 17.25
Hvy. axle turnings....	11.00 to 11.50
Machine shop turn....	11.50 to 12.00
Knuckles & couplers..	20.50 to 21.00
Coil & leaf springs....	20.50 to 21.00
Rolled steel wheels....	20.50 to 21.00
Low phos. billet crops.	20.50 to 21.00
Shov. turnings	12.25 to 12.75
Mixed bor. & turn.....	11.75 to 12.25
Cast iron borings	11.75 to 12.25
Steel car axles	20.50 to 21.00
No. 1 machinery cast..	17.00 to 17.50
No. 1 cupola cast	16.25 to 16.75
Stove plate	13.00 to 13.50
Steel rails under 3 ft...	20.00 to 20.50
Cast iron carwheels...	16.00 to 16.50
Railroad malleable	18.50 to 17.50
Chemical borings	13.00 to 13.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.....	$12.50 to $13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings..	.... 8.00
Stove plate	.... 8.50
Steel axles	.... 15.00
Iron axles	.... 15.00
No. 1 RR. wrought....	.... 10.00
Rails for rolling	.... 14.00
No. 1 cast	.... 13.50
Tramcar wheels	.... 13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. steel....	$16.50 to $17.00
No. 1 hvy. melting....	15.50 to 16.00
No. 2 hvy. melting....	14.50 to 15.00
No. 1 locomotive tires..	15.50 to 16.00
Misc. stand.-sec. rails.	16.75 to 17.25
Railroad springs	18.25 to 18.75
Bundled sheets	10.50 to 11.00
No. 2 RR. wrought ...	15.50 to 16.00
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.....	5.50 to 6.00
Rails for rolling	17.50 to 18.00
Machine shop turn....	6.00 to 6.50
Heavy turnings	10.50 to 11.00
Steel car axles	20.00 to 20.50
Iron car axles	21.00 to 21.50
No. 1 RR. wrought	13.50 to 14.00
Steel rails under 3 ft..	17.50 to 18.00
Steel angle bars	16.25 to 16.75
Cast iron carwheels...	15.25 to 15.75
No. 1 machinery cast.	13.00 to 13.50
Railroad malleable	15.50 to 16.00
No. 1 railroad cast....	13.25 to 13.75
Stove plate	11.25 to 11.75
Agricul. malleable	12.50 to 13.00
Grate bars	11.00 to 11.50
Brake shoes	13.00 to 13.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$15.00 to $16.00
No. 2 hvy. mltng. steel.	12.75 to 13.25
Scrap rails for mltng..	15.50 to 16.00
Loose sheet clippings.	9.50 to 10.00
Bundled sheets	11.50 to 12.00
Cast iron borings	7.50 to 8.00
Machine shop turns ..	8.50 to 9.00
No. 1 busheling.....	12.00 to 12.50
No. 2 busheling.....	7.50 to 8.00
Rails for rolling	16.00 to 16.50
No. 1 locomotive tires..	13.75 to 14.25
Short tails	18.75 to 19.25
Cast iron carwheels ..	14.75 to 15.25
No. 1 machinery cast..	15.75 to 16.25
No. 1 railroad cast	14.75 to 15.25
Burnt cast	10.75 to 11.25
Stove plate	10.75 to 11.25
Agricult. malleable ...	14.75 to 15.25
Railroad malleable	16.25 to 16.75

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.75 to 14.25
Borings and turnings.	10.50 to 11.00
Long turnings	10.00 to 10.50
Short shov. turnings..	11.25 to 11.75
No. 1 machinery cast..	15.00 to 15.50
Automotive cast	15.00 to 15.50
Hydraul. comp. sheets.	15.50 to 16.00
Stove plate	9.25 to 9.75
New factory bushel...	14.75 to 15.25
Old No. 2 busheling ..	9.00 to 9.50
Sheet clippings	11.75 to 12.25
Flashings	14.00 to 14.50
Low phos. plate scrap.	16.25 to 16.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.50 to $19.00
Hydraulic bundles	18.25 to 18.75
Machine shop turn....	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.50 to $14.00
No. 2 hvy. mltng. steel.	12.00 to 12.75
Hvy. breakable cast...	13.50 to 14.00
No. 1 machinery cast.	14.50 to 15.00
No. 2 cast	12.00 to 12.50
Stove plate	10.50 to 11.00
Steel car axles	20.50 to 21.50
Shafting	17.00 to 18.00
No. 1 RR. wrought ...	12.50 to 13.00
No. 1 wrought long....	11.50 to 12.00
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	15.50 to 16.00
Clean steel turnings...	8.25 to 8.75
Cast borings	8.50 to 8.75
No. 1 blast furnace	7.00 to 7.50
Cast borings (chem.)..	11.00 to 11.50
Unprepar. yard scrap.	9.00 to 9.50

Per gross ton, delivered local foundries:

No. 1 machn. cast.....	$16.00 to $16.50
No. 1 hvy. cast cupola.	12.50 to 13.00
No. 2 cast	11.50 to 12.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.80 to $14.30
Scrap rails	13.80 to 14.30
No. 2 steel	12.30 to 12.55
Breakable cast	12.60 to 13.10
Machine shop turn.....	7.55 to 8.30
Unmixed bor. & turn..	.... 8.30
Bund. skeleton long....	11.55 to 11.80
Shafting	16.75 to 17.00
Cast bor. chemical.....	7.00 to 8.75

Per gross ton delivered consumers' yards:

Textile cast	$14.00 to $15.00
No. 1 machine cast ..	15.00 to 16.00
Stove plate	10.50 to 11.00

EXPORT

Dealers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	$13.50
No. 2 hvy. mltng. steel.	12.50
No. 2 cast	11.00
Stove plate	10.00
Rails (scrap)	13.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$15.50
No. 2 hvy. mltng. steel.	14.50
Rails (scrap)	15.50
Stove plate	$7.75 to 8.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$17.25 to $17.50
No. 2 hvy. mltng. steel.	16.25

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	$14.25
No. 2 hvy. mltng. steel.	13.25

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to $11.00
Compressed bundles ..	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.80c.

Wire Rods
(No. 5 to 15/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$43.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	44.00
F.o.b. Worcester, Mass.	45.00
F.o.b. Birmingham	46.00
F.o.b. San Francisco	52.00
F.o.b. Galveston	49.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.20c.
F.o.b. Chicago or Gary	2.25c.
F.o.b. Duluth	2.35c.
Del'd Detroit	2.35c.
F.o.b. Cleveland	2.25c.
F.o.b. Buffalo	2.30c.
Del'd Philadelphia	2.51c.
Del'd New York	2.55c.
F.o.b. Birmingham	2.35c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars Pacific ports	2.75c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.05c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.10c.
F.o.b. Buffalo	2.15c.
F.o.b. Birmingham	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.60c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.25c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.30c.
Del'd Detroit	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.65c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.10c.
F.o.b. Buffalo, Cleveland Youngstown, Chicago, Gary or Birmingham	2.15c.
F.o.b. cars dock Gulf ports	2.50c.
F.o.b. cars dock Pacific ports	2.50c.

Iron

F.o.b. Chicago	2.15c.
F.o.b. Pittsburgh (refined)	3.25c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.55c.
F.o.b. Cleveland, Chicago and Gary	2.60c.
F.o.b. Buffalo	2.65c.
Del'd Detroit	2.70c.
Del'd eastern Michigan	2.75c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago or Gary	2.10c.
Del'd Cleveland	2.235c.
F.o.b. Coatesville or Spar. Pt.	2.15c.
Del'd Philadelphia	2.235c.
Del'd New York	2.33c.
F.o.b. Birmingham	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.60c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.60c.
F.o.b. Chicago	3.65c.
F.o.b. Coatesville	3.70c.
F.o.b. cars dock Gulf ports	4.00c.
F.o.b. cars dock Pacific ports	4.15c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
Del'd Cleveland	2.235c.
F.o.b. Buffalo or Bethlehem	2.15c.
Del'd Philadelphia	2.255c.
Del'd New York	2.305c.
F.o.b. Birmingham (standard)	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.60c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.40c.
F.o.b. Chicago or Buffalo	2.50c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.85c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$39.00
Angle bars, per 100 lb.	2.55c. to 2.70c.

F.o.b. Basing Points

Light rails (from billets) per gross ton	$38.00
Light rails (from rail steel) per gross ton	37.00

	Base per 100 Lb.
Spikes	2.90c.
Tie plates, steel	2.10c.
Tie plates, Pacific Coast ports	2.20c.
Track bolts, to steam railroads	4.00c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.15c.
No. 10, f.o.b. Gary	2.25c.
No. 10, del'd Detroit	2.35c.
No. 10, del'd Philadelphia	2.46c.
No. 10, f.o.b. Birmingham	2.30c.
No. 10, f.o.b. cars dock Pacific ports	2.70c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.80c.
No. 24, f.o.b. Gary	2.90c.
No. 24, del'd Detroit	3.00c.
No. 24, del'd Philadelphia	3.11c.
No. 24, f.o.b. Birmingham	2.95c.
No. 24, f.o.b. cars dock Pacific ports	3.45c.
No. 24, wrought iron, Pittsburgh	4.50c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.80c.
No. 10 gage, f.o.b. Gary	2.90c.
No. 10 gage, f.o.b. Detroit	3.00c.
No. 10 gage, del'd Philadelphia	3.11c.
No. 10 gage, f.o.b. Birmingham	2.95c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.40c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.25c.
No. 20 gage, f.o.b. Gary	3.35c.
No. 20 gage, del'd Detroit	3.45c.
No. 20 gage, del'd Philadelphia	3.56c.
No. 20 gage, f.o.b. Birmingham	3.40c.
No. 20 f.o.b. cars dock Pacific ports	3.80c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.40c.
No. 24, f.o.b. Gary	3.50c.
No. 24, del'd Philadelphia	3.71c.
No. 24, f.o.b. Birmingham	3.55c.
No. 24, f.o.b. cars dock Pacific ports	4.00c.
No. 24, wrought iron, Pittsburgh	5.15c.

Electrical Sheets
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.70c.
F.o.b. Gary	3.80c.
F.o.b. cars dock Pacific ports	4.40c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.20c.
No. 20, f.o.b. Gary	3.30c.
No. 20, f.o.b. Birmingham	3.80c.
No. 20, f.o.b. cars dock Pacific ports	3.80c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.95c.
No. 28, Gary	3.05c.
No. 28, cars dock Pacific ports, boxed	3.825c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$4.85
Standard cokes, f.o.b. Gary	4.95

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes
Manufacturing Ternes

	Per Base Box
F.o.b. Pittsburgh	*$4.15
F.o.b. Gary	* 4.25

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	2.15c.
All widths up to 24 in., Chicago	2.25c.
All widths up to 24 in., del'd Detroit	2.35c.
All widths up to 24 in., Birmingham	2.30c.
Cooperage stock, Pittsburgh	2.25c.
Cooperage stock, Chicago	2.35c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	2.85c.
F.o.b. Cleveland	2.85c.
Del'd Chicago	3.13c.
F.o.b. Worcester	3.05c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	2.85c.	3.05c.
Carbon	.51- .75	3.95c.	4.15c.
Carbon	.76-1.00	5.70c.	5.90c.
Carbon	Over 1.00	7.75c.	7.95c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.10c.
No. 14, Worcester	3.50c.
No. 20, Pittsb'gh or Cleveland	3.50c.
No. 20, Worcester	3.90c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Spring wire	3.20c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.25
Smooth coated nails	2.25

	Base per 100 Lb.
Annealed fence wire	$2.90
Galvanized fence wire	3.30
Polished staples	2.95
Galvanized staples	3.20
Barbed wire, galvanized	2.75
Twisted barbless wire	2.75
Woven wire fence, base column.	63.00
Single loop bale ties, base column	55.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	.57	37	¼ & ⅜	+6	+26
¼ to ⅜	.60	44½	½	27	10½
½	64½	55	¾	32	16
¾	67½	59	1 & 1¼	35	21
1 to 3	69½	61½	1½	39	23½
			2	38½	23

Lap Weld

2	62	53½	2	32½	18
2½ to 3.65		56½	2½ to 3½	33½	20½
3½ to 6.67		58½	4 to 8	35½	24
7 & 8.66		56½	9 to 12	28½	15
9 & 10.65		56			
11 & 12.64		55			

Butt Weld, extra strong, plain ends

⅛	55½	42½	¼ & ⅜	+7	+39
¼ to ⅜	.57½	46½	½	28	13
½	62½	54½	¾	33	18
¾	66½	58½	1 to 2	.39	24½
1 to 3	.68	61			

Lap Weld, extra strong, plain ends

2	60	52½	2	35½	21½
2½ to 3.64		56½	2½ to 4.41		28½
3½ to 6.67		60	4½ to 6.40		28
7 & 8	.66½	.57	7 & 8	.41½	28½
9 & 10	.65½	56	9 to 12	.32	20½
11 & 12	.64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	17.61	16.01
2¾ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	37.09	34.62
4 in. od.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5	%
12,000 lb. or ft. to 24,999 lb. or ft.	12½	%
6,000 lb. or ft. to 11,999 lb. or ft.	25	%
2,000 lb. or ft. to 5,999 lb. or ft.	35	%
Under 2,000 lb. or ft.	50	%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$50.00
6-in. and larger, del'd New York	48.00
*6-in. and larger, Birmingham	42.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	50.50
F.o.b. dock, Seattle	50.50
4-in., f.o.b. dock, San Francisco or Los Angeles	53.50
F.o.b. dock, Seattle	53.50

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $41, Birmingham, and $49.50, delivered Chicago; and 4-in. pipe, $44, Birmingham, and $52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts: ½ in. x 6 in. and smaller	70
Larger than ½ in.	65 and 10
Lag bolts	65 and 10
Plow bolts, Nos. 1, 2, 3, and 7 heads	65, 10 and 10
Hot-pressed nuts, blank or tapped, square	65 and 10
Hot-pressed nuts, blank or tapped, hexagon	65 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	65 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 5
Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 5
Stove bolts in bulk	81½

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.	$3.25
F.o.b. Chicago or Birmingham	3.35

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $55 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.75c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.25c. base per lb. Delivered Detroit, 3.40c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	60c.
High carbon chrome	39c.
Oil hardening	22c.
Special	20c.
Extra	16½c.
Regular	13c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£9
Billets, open-hearth	£6 to £6 5s.
Tin plate, per base box	18s. 9d. to 19s.
Steel bars, open-hearth	£7 17½s.
Beams, open-hearth	£7 12½s.
Channels, open-hearth	£7 17½s.
Angles, open-hearth	£7 12½s.
Black sheets, No. 24 gage.	£10 15s.
Galvanized sheets, No. 24 gage	£13 5s.

CONTINENTAL

Per Metric Ton, Gold £, f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£3 4s. 6d.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£3 15s. 6d.
Sheet bars	£2 15s. 6d.
Plate, ¼ in. and up	£6 14s.
Plate, 3/16 in. and 5 mm.	£5
Sheet, ⅛ in.	£5 5s.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip, base	£4
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G.	£8 15s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.40c.
Structural shapes	3.40c.
Soft steel bars and small shapes	3.30c.
Reinforcing steel bars	3.30c.
Cold-finished and screw stock:	
Rounds and hexagons	3.80c.
Squares and flats	3.80c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.50c.
Hoops	4.00c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.65c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Hot-rolled sheets (No. 10)	3.25c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.94
Spikes, large	3.25c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	$3.75
Wire, black, soft ann'l'd, base per 100 lb.	3.15c.
Wire, galv. soft, base per 100 lb.	3.55c.
Common wire nails, per keg	2.50c.
Cement coated nails, per keg	2.50c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.45c.
Soft steel bars, rounds	3.35c.
Soft steel bars, squares and hexagons	3.50c.
Cold-fin. steel bars:	
Rounds and hexagons	3.95c.
Flats and squares	3.95c.
Hot-rolled strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	4.00c.
Track bolts (keg lots)	5.10c.
Rivets, structural (keg lots)	4.10c.
Rivets, boiler (keg lots)	4.10c.

	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb.	$4.05
Com. wire nails, 15 kegs or more	2.70c.
Cement c't'd nails, 15 kegs or more	2.70c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants wihtin the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.65c.
Structural shapes	3.62c.
Soft steel bars, rounds	3.62c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.22c.
Flats and squares	4.22c.
Cold-rolled: strip, soft and quarter hard	3.57c.
Hoops	3.82c.
Bands	3.82c.
Hot-rolled sheets (No. 10)	3.57c.
Hot-rolled ann'l'd sheets (No. 24*)	4.22c.
Galvanized sheets (No. 24*)	4.82c.
Long terne sheets (No. 24)	5.55c.
Armco iron, galv. (No. 24†)	5.85c.
Toncan iron, galv. (No. 24†)	5.85c.
Galvannealed (No. 24†)	5.95c.
Armco iron, hot-rolled annealed (No. 24†)	5.30c.
Toncan iron, hot-rolled annealed (No. 24†)	5.30c.
Armco iron hot-rolled (No. 10†)	4.35c.
Toncan iron, hot-rolled (No. 10†)	4.35c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.85c.
Deep drawing	5.50c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.32c.
SAE, 3100, hot-rolled	5.72c.
SAE, 6100 hot-rolled, annealed	9.92c.
SAE, 2300, cold-rolled	8.30c.
SAE, 3100, cold-rolled, annealed	7.75c.
Floor plate, ⅛ in. and heavier	5.45c.
Standard tool steel	11.75c.
Wire, black, annealed (No. 9)	3.60c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.15c. to 10.15c.
Common wire nails, base per keg	$3.70

	Per Cent Off List
Machine bolts, square head and nut: All diameters	65
Carriage bolts, cut thread: All diameters	65

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
† 125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.69c.
Bars, soft steel (rounds and flats)	3.59c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.74c.
Cold-fin. rounds, shafting, screw stock	4.19c.
Hot-rolled annealed sheets (No. 24)	4.29c.
Galv. sheets (No. 24)	4.89c.
Hot-rolled sheets (No. 10)	3.59c.
Black corrug. sheets (No. 24)	4.29c.
½ Galv. corrug. sheets	4.89c.
Structural rivets	4.44c.
Boiler rivets	4.44c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.30c.
*Structural shapes	3.30c.
*Soft steel bars, small shapes, iron bars (except bands)	3.45c.
‡Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.18c.
*Steel hoops	3.80c.
*Steel bands, No. 12 and 3/16 in. incl.	3.55c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	4.15c.
†Galvanized sheets (No. 24)	4.80c.
*Hot-rolled annealed sheets (No. 10)	3.40c.
Diam. pat. floor plates, ¼ in.	5.25c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.56c.
Soft steel bars	3.25c.
‡Reinforc. steel bars	2.25c.
†Cold-finished steel bars	3.95c.
Flat-rolled steel under ¼ in.	3.66c.
Cold-finished strip	†3.25c.
Hot-rolled annealed sheets (No. 24)	4.31c.
Galvanized sheets (No. 24)	4.91c.
Hot-rolled sheets (No. 10)	3.41c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.66c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.45c.

	Per Cent Off List
Machine and carriage bolts, small	70
Large	65 and 10
Nuts, 100 count	65

†Outside delivery 10c. less.
*For 5000 lb. or less.
‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.65c.
Floor plates	5.40c.
Bars, rounds, flats and angles	3.55c.
Other shapes	3.70c.
Rail steel reinforc. bars	3.40c.
Hoops and bands, 3/16 in. and lighter	3.75c.
Cold-finished bars	4.15c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.05c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.65c.
Hot-rolled sheets (No. 10)	3.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb	8.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb
Plates	3.62c.
Struc. shapes	3.50c.
Soft steel bars	3.40c.
Reinforcing bars	2.75c.
Cold-fin. flats and sq.	4.00c.
Rounds and hex.	4.00c.
Cold-rolled strip steel	3.44c.
Hot-rolled annealed sheets (No. 24)	4.46c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.72c.
Galv. sheet (No. 24)	5.00c.
Bands	3.72c.
Hoops	3.72c.
Heavy top-rolled sheets	3.47c.
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb. (2500-lb. lots or under)	4.10c.
(Over 2500 lb.)	4.00c.

BOSTON

	Base per Lb
Channels, angles	3.75c.
Tees and zees, under 3"	4.00c.
H beams and shapes	3.77c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.78c.
Floor plates, diamond pattern	5.58c.
Bar and bar shapes (mild steel)	3.75c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.90c. to 4.90c.
Half rounds, half ovals, ovals and bevels	5.00c.
Tire steel	5.00c.
Cold-rolled strip steel	3.495c.
Cold-finished rounds, squares and hexagons	4.30c.
Cold-finished flats	4.30c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	4.55c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.44c.
Structural shapes	3.65c.
Plates	3.65c.
Floor plates	5.40c.
Hot-rolled annealed sheets (No. 24)*	4.34c.
Hot-rolled sheets (No. 10)	3.44c.
Galvanized sheets (No. 24)**	5.00c.
Bands and hoops	3.69c.
†Cold-finished bars	4.04c.
Cold-rolled strip	3.43c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.79c.

Bolts and nuts, in cases, 65 per cent off list

Broken cases .....60 per cent off

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base; 400 to 3499 lb., base; 3500 lb. and over, base less .25c.

** Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3749 lb., base less .20c.; 3750 to 7499 lb., less .40c.; 7500 lb. and over, less .60c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Common wire nails, base per keg $2.75

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.56c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.46c.
Soft steel bars, squares and hexagons	3.61c.
Hot-rolled strip	3.71c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Galvanized sheets (No. 24)	4.76c.
Cold-finished steel bars	4.06c.
Structural rivets (keg lots)	4.21c.
Boiler rivets, cone head (keg lots)	4.21c.
Track spikes (keg lots)	4.11c.
Track bolts (keg lots)	5.21c.
Black annealed wire (No. 14 and heavier)	4.16c.
Com. wire nails and cement coated nails 15 kegs and over	2.81c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller	65
Larger	65
Coach and lag screws	65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	65

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.60c.
Structural shapes	3.70c.
Plates	3.70c.
Cold-finished bars	4.42c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24	4.90c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.50c.
Structural shapes	3.60c.
Reinforcing bars	....prices on application
Plates	3.60c.
Hot-rolled sheets, No. 10	3.45c.
Bands	3.50c.
Hoops	3.75c.
Special threading steel	3.60c.
Diamond pattern floor plates ¼ in. and heavier	5.60c.
Galvanized bars, bands and small shapes	6.00c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	4.15c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.71c.
Iron bars	3.71c.
Reinforcing bars	3.71c.
Structural shapes	3.81c.
Plates	3.81c.
Hot-rolled sheets No. 10	3.66c.
Hot-rolled annealed sheets, No. 24*	3.56c.
Galvanized sheets No. 24*	4.16c.
Steel bands	3.91c.
Cold-finished bars	4.51c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	3.82c.
Shapes, bar size	3.82c.
Iron bars	3.82c.
Structural shapes	3.92c.
Plates	3.92c.
Hot-rolled sheets, No. 10	3.77c.
Hot-rolled annealed sheets, No. 24	4.67c.
Galvanized sheets, No. 24	5.27c.
Steel bands	4.02c.
Cold-drawn rounds	4.49c.
Cold-drawn flats, squares, hexagons	6.49c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.70c.
Reinforcing bars	3.50c.
Structural shapes	3.80c.
Plates	3.80c.
Hot-rolled sheets, No. 10	3.85c.
Hot-rolled annealed sheets, No. 24	4.55c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.25c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$2.80
Bolts and nuts, per cent off list	70-10

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.75c.	4.00c.	3.85c.
Shapes, standard	3.75c.	4.00c.	3.85c.
Soft steel bars	3.85c.	4.00c.	4.10c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.725c.	2.725c.	2.725c.
Hot-rolled annealed sheets (No. 24)	4.65c.	4.60c.	4.85c.
Hot-rolled sheets (No. 10)	3.95c.	4.15c.	4.10c.
Galv. sheets (No. 24 and lighter)	5.25c.	5.05c.	5.35c.
Galv. sheets (No. 22 and heavier)	5.50c.	5.20c.	5.35c.
Cold finished steel			
Rounds	6.30c.	6.35c.	6.60c.
Squares and hexagons	7.55c.	7.60c.	6.60c.
Flats	8.05c.	8.10c.	7.60c.
Common wire nails—base per keg less carload	$3.10	$3.05	$3.10

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$48.00
High-heat duty, New Jersey	58.00
High-heat duty, Ohio	43.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	43.00
Intermediate, New Jersey	46.00
No. 1, Ohio	40.00
Ground fire clay, per ton	7.00

5 per cent trade discount on fire clay brick.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$48.00
Chicago District	57.00
Birmingham	48.00
Silica cement per net ton	8.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	42.00
Domestic, f.o.b. Chewelah, Wash.	24.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.75
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.27
Delivered Newark or Jersey City	23.39
Delivered Philadelphia	22.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	21.00
F.o.b. Jackson, Ohio	22.75
Delivered Cincinnati	21.07
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	18.50
Delivered San Francisco, Los Angeles or Seattle	23.00
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	20.50
Delivered Cincinnati	21.01
Delivered Canton, Ohio	21.76
Delivered Mansfield, Ohio	22.26
F.o.b. Jackson, Ohio	22.25
F.o.b. Provo, Utah	18.00
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Everett, Mass.	$23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Boston Switching District	24.50
Delivered Newark or Jersey City	24.39
Delivered Philadelphia	23.76
F.o.b. Buffalo and Erie, Pa., and Duluth	22.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	21.50
F.o.b. Birmingham	22.50
Delivered Cincinnati	22.51
Delivered Canton, Ohio	22.76
Delivered Mansfield, Ohio	23.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$25.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$23.50
Delivered Chicago	26.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.25	20.50
Malleable	21.00
Basic	20.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	$24.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$29.50
10.51 to 11.00%	30.00
11.00 to 11.50%	30.50
11.51 to 12.00%	31.00
12.01 to 12.50%	31.50
12.51 to 13.00%	32.00
13.01 to 13.50%	32.50
13.51 to 14.00%	33.00
14.01 to 14.50%	33.50
14.51 to 15.00%	34.00
15.01 to 15.50%	34.50
15.51 to 16.00%	35.00
16.01 to 16.50%	35.50
16.51 to 17.00%	36.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	13.00c. to 13.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	27c. to 30c.
Man., African, Indian, 44-48%	25c to 30c.
Man., African, Indian, 49-51%	27c. to 30c.
Man., Brazilian, 46 to 48½%	Nominal..25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	$15.25 to $15.50
Tungsten, domestic, scheelite delivered, nominal	15.00

Per Gross Ton

Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$18.00 to 19.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	20.00 to 21.00
Chrome concentrate, 50% and over Cr_2O_3 c.i.f. Atlantic ports	22.00
52% Cr_2O_3 (Turkish)	23.00 to 24.00
48 to 49% Cr_2O_3 (Turkish)	20.00 to 21.00

FLUORSPAR *Per Net Ton*

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00 to $19.00
Domestic, barge and rail	18.50 to 19.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	23.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL *Per Gal.*

F.o.b. Bayonne or Baltimore No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	4.25c.
Del'd Ch'go, No. 5 industrial	3.90c.
Del'd Cleve'd, No. 3 distillate	6.00c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Foundry, f.o.b. Connellsville, Prompt	4.50 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	12.00
Foundry, by-product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by-product, Philadelphia	9.85
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.76

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

NIAGARA FALLS, N.Y.

Sales Offices: NEW YORK—30 Church St. • PITTSBURGH—Oliver Bldg. • CLEVELAND—Hanna Bldg.

FABRICATED STEEL

. . . Lettings decline to 12,950 tons from 30,025 tons in the previous week.

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. . . New projects also lower at 26,900 tons as against 33,495 tons last week.

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. . . Plate awards total 2175 tons.

NORTH ATLANTIC STATES

Columbia-Windham, Conn., 130 tons, bridge, to American Bridge Co.

Carneys Point, N. J., 145 tons, building, for E. I. duPont de Nemours & Co., to Belmont Iron Works, Philadelphia.

New York, 170 tons, curb angles, to Egleston Brothers & Co., Long Island City.

New York, 500 tons, bleacher stand at Yankee Staudium, to Ingalls Iron Works Co., Birmingham.

Union, N. Y., 230 tons, bridge for Erie Railroad, to American Bridge Co.

Tuckahoe, N. J., 335 tons, highway work, to Bethlehem Steel Co.

Dover, Del., 180 tons, airplane factory, to Bethlehem Steel Co.

SOUTH AND SOUTHWEST

Columbia, Tenn., 1040 tons, three buildings for National Carbon Co., to Bethlehem Steel Co.

State of North Carolina, 270 tons, North River bridge, to Bethlehem Fabricators, Inc.

Almond, N. C., 450 tons, bridge, to Virginia Bridge Co.

Lanett, Ga., 210 tons, warehouse and machine shop, Lanett Bleachery & Dye Works, to Bethlehem Steel Co.

Miami, Fla., 2100 tons, beams, etc., for Overseas Road and Toll Bridge district, to American Bridge Co.

Flagstaff, Ariz., 215 tons, Padre Canyon arch bridge, to Bethlehem Steel Co.

CENTRAL STATES

Cincinnati, 240 tons, distributing house and garage, Western Electric Co., to Oregonia Bridge Co., Lebanon, Ohio.

Cincinnati, 725 tons, power station unit, Cincinnati Gas & Electric Co., to Mount Vernon Bridge Co., Mount Vernon, Ohio.

Milwaukee Road, 1105 tons, bridges; 270 tons to American Bridge Co., 400 tons to Worden-Allen Co., 225 tons to Milwaukee Bridge Co., 210 tons to Wisconsin Bridge & Iron Co., Milwaukee.

Sioux Rapids, Iowa, 200 tons, State bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Minot, N. D., 220 tons, State highway viaduct, to Bethlehem Steel Co.

Chicago, 415 tons, 47th Street subway, to Duffin Iron Co.

Clifton, Ill., 140 tons, bridge for Illinois Central, to Bethlehem Steel Co.

South Milwaukee, Wis., 125 tons, office addition, Line Material Co., to Milwaukee Bridge Co., Milwaukee.

Racine, Wis., 150 tons, sewage treatment plant, to Lakeside Bridge & Steel Co., Milwaukee.

WESTERN STATES

Denver, 350 tons, West 38th Avenue underpass, to Bethlehem Steel Co.

Culver City, Cal., 800 tons, four sound stages for Metro-Goldwyn-Mayer Corp., to Consolidated Steel Corp.

Palomer Mountain, Cal., 600 tons, revolving dome observatory for California Institute of Technology, to Consolidated Steel Corp.

San Diego, Cal., 150 tons, generating station room for Public Utility Engineering & Service Corp., to Minneapolis-Moline Power Implement Co.

San Francisco, 215 tons, duPont building, to Bethlehem Steel Co.

San Francisco, 400 tons, Bay Bridge Exposition buildings, to Judson-Pacific Co.

Nicolaus, Cal., 500 tons, Feather River bridge, to Judson-Pacific Co., San Francisco.

Santa Rosa, Cal., 265 tons, Rosenberg department store, to Bethlehem Steel Co.

South Gate, Cal., 260 tons, building for United States Gypsum Co., to Worden-Allen Co., Milwaukee.

Salem, Ore., 100 tons, post office, to Poole & McGonigle, Inc., Portland.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Leominster, Mass., 100 tons, State bridge.

Attleboro, Mass., 100 tons, State bridge.

Pittsburg, N. H., 100 tons, State dam.

New York, 475 tons, alterations and additions to Spear & Co. building.

New York, 4400 tons, tunnel rock section four, Midtown-Hudson tunnel, for Port of New York Authority.

Tompkins County, N. Y., 200 tons, State highway bridge; bids this week.

Delaware County, N. Y., 300 tons, State highway bridge; bids this week.

Erie County, N. Y., jail, 600 tons; bids late this month.

Geneseo, N. Y., 420 tons, normal school addition; Thomas C. Brown, Schenectady, general contractor.

SOUTH AND SOUTHWEST

Wellsburg, W. Va., 2000 tons, American Gas & Electric Co. building.

Plymouth, N. C., 1100 tons, paper mill; previously reported as 700 tons.

Norfolk, Ark., 700 tons, bridge.

Beverly, Tex., 600 tons, tainter gates.

CENTRAL STATES

Chicago, 350 tons, California Avenue bridge.

Hillside, Ill., 400 tons, Wolf Road bridge.

Milwaukee, 500 tons, machine shop, Chain Belt Co.; bids closed Jan. 18.

East St. Louis, Ill., 7000 to 8000 tons, toll bridge across Mississippi River; plans expected to be ready in March for bids.

WESTERN STATES

Inglewood, Cal., 1000 tons, buildings for North American Aviation Co.; bids opened.

Sacramento, Cal., 6000 tons, Government buildings; bids expected about March 1.

San Francisco, 720 tons, 10 bridges for Southern Pacific; bids soon.

San Francisco, 450 tons, Stanford University hospital; bids soon.

FABRICATED PLATES

AWARDS

Plymouth, N. C., 650 tons, tanks for Kieckhefer Container Co., to Ingalls Iron Works Co.

Barberton, Ohio, 345 tons, pipe line, to Youngstown Sheet & Tube Co.

Galveston, Tex., 130 tons, riveted pipe, to Wyatt Metal & Boiler Works.

Pittsburgh, 300 tons, two coal barges for National Barge Co., to American Bridge Co.

Franklin, Va., 450 tons, Chesapeake Camp Corp. building, to Norfolk Tank Corp., Norfolk, Va.

Green Bay, Wis., 300 tons, 500,000-gal. water tank and tower, to Pittsburgh-Des Moines Steel Co.

NEW PROJECTS

Pittsburg, N. H., 300 tons, steel pipe.

Oostburg, Wis., 125 tons, 60,000-gal. water tank on 100-ft. steel tower, bids soon; Jerry Donohue Engineering Co., Sheboygan, Wis., consulting engineer.

Seattle, Wash., 600 tons, tanks for Shell Oil Co.

Anti-Lewis Workers To Combat SWOC

PITTSBURGH, Jan. 19—The outstanding feature on the labor front last week was the setting up of an office by the committee for defense of the employee representation plan, employment of legal council and a public relations man. This marks the beginning of an intensive drive on the part of the defense council, composed of representatives of Carnegie-Illinois's Pittsburgh and Youngstown plants, to combat the activities of the Steel Workers' Organizing Committee backed by John L. Lewis.

The defense committee is meeting in Pittsburgh this week, devising ways and means of raising the money necessary to carry on their drive. Meanwhile, the first step of the special grievance committee of four employees of the Carnegie-Illinois Steep Corp. will be to make a visit to each of the company's plants in this district. An attempt will be made to learn from employees what grievances, if any, they have on the operation of the employee representation plan. Recently, Benjamin F. Fairless, president of Carnegie-Illinois Steel Corp., in authorizing the committee with full power to investigate charges made against supervisors or superintendents, said, "You come and go as you see fit. Will back you to the limit. If the men want this plan, we want it; if the men don't want it, we don't want it." In answering a specific question of a committee as to what action the company would take if the group finds that a superintendent of a plan refuses to cooperate with the plan of employee representation, Mr. Fairless stated, "Well, in that case if after warnings, a superintendent still refuses to cooperate, I guess we'd have to get a new superintendent."

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Railroads come into the market for shop equipment; Milwaukee Road issues list of 44 items to cost $200,000.

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. . . Sales not up to the high level of December, but a good January business is expected.

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. . . Industry is working at a high rate to turn out large volume of orders on its books.

Chicago

THE Milwaukee Road has issued a $200,000 list which enumerates 44 items. The Illinois Central has placed orders and the Santa Fe is closing against its list, thus marking the past four weeks as the best railroad activity in about six years. Miscellaneous sales remain on a high level and some dealers are now quoting November deliveries on some items. The automobile strike has not affected local dealers, but machine tool manufacturers report some holdup orders. This condition does not change their production schedules because books are heavy and there are numerous outlets for the tools that reach shipping floors. The agricultural implement group is working on budgets which should be completed before the end of the month, after which they will again start buying. All machine tools except planers are now bringing higher prices.

Cincinnati

MACHINERY demand in this area is approaching capacity proportions as heavy tool builders report increasing business. Strikes in the automotive industry have had no appreciable effect here, although, of course, the usual psychological reaction to labor disturbance in management circles is noticed. The fact that automobile manufacturers virtually completed retooling programs just prior to production of new models accounts in large degree for the failure of the layoffs to react in the tool market here. Current business is well scattered throughout the country and comes from varied industries. Some foreign business is being placed, but manufacturers indicate this is not of large proportions. Inquiry is brisk. Factory operations have passed 80 per cent of capacity as manufacturers press for greater production.

New York

WITH most machine purchasers busy with preparations for 1937 budgets, orders are coming in more slowly than this time last month, but are expected to pick up in volume in February as the heavy industries broaden their demands. Some fairly good-sized inquiries for machines are understood to be circulating, but the average order consists of one and two machines. Nearly all of the railroads have extensive building programs under way or in prospect, and are looked to for a resumption of buying in the near future.

Detroit

ORDERS for standard equipment were at a high volume during the first half of January, as buyers rushed in to protect themselves on price changes made by most machine tool builders. In a few instances expected closures were not made, however, because of the uncertainty developing from the strike situation in General Motors plants. Although all program work has been temporarily held up by the corporation, a number of spot orders were placed for immediate delivery to fill up weak spots in the line so as to avoid all bottlenecks when production is resumed. Ford continues to be an active factor in the market, and, although figures are still being taken on proposals for cylinder block lines for several Chrysler units, no action is expected until the atmosphere is definitely cleared as regards the possibility of further strikes.

A Roumanian automobile company has established an office in Detroit for the purpose of buying machinery for the production of passenger cars in that country. An annual production of approximately 100,000 cars has been budgeted.

Producers of cemented carbide tools report dollar volume of sales back to normal 60 days after cutting base price of tip material in half.

Cleveland

MACHINE tool sales, which dropped sharply when price advances became effective Jan. 1, improved slightly the past week. However, with the heavy buying in December, much of which resulted from pressure of sellers to get orders closed at the old prices, not much activity is expected during the remainder of the month. Deliveries of only a very few machines have been held up because of the General Motors strike. Interruption of production in some other plants is having some bearing on the present situation. The Cleveland Tractor Co. has shut its plant entirely down because it is unable to get engines from the Hercules Motor Co., Canton, which has been closed down by strike for the past month. New York Central Railroad is inquiring for a screw machine, turret lathe, radial drill and pipe machine for its Collinwood shops, Cleveland.

Pittsburgh

ALTHOUGH inquiries are not as strong as they were in December, a fairly good volume of requests for data is being received. Interesting to local dealers is a formal inquiry by a large railroad for an axle lathe, a wheel lathe, boring mill and other equipment. The volume of orders has returned to normalcy following the year-end rush, and dealers look for a good first quarter. Machine tool builders in this district will benefit indirectly from the additional expansion program disclosed last week by the leading steel interest, which involves the construction of a new hot and cold strip mill, a slabbing mill and an electrification program. Some of those machine manufacturers who had not previously announced price increases are taking action on this matter and will undoubtedly advance their quotations in the near future.

Total value of ball and roller bearings and parts made in the United States in 1935 amounted to $85,794,133, a 111.7 per cent increase over the $40,530,143 reported in 1933, according to a statement from the Bureau of the Census, Washington. Ball bearings and parts comprised $44,472,578 of the total, while roller bearings and parts accounted for $41,321,555.

PLANT EXPANSION AND EQUIPMENT BUYING

. . . St. Joe Paper Co., Port St. Joe, Fla., has let contract for a pulp and paper mill to cost $6,500,000 complete.

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. . . Union Oil Co., San Francisco, plans an expenditure of $1,900,000 for additions and equipment to its refinery at Oleum, Cal.

NORTH ATLANTIC

Frederick Hart & Co., Inc., Main Street, Poughkeepsie, N. Y., manufacturer of special machinery and parts, tools, etc., has let general contract to L. H. Swenson & Co., Inc., 2 Cannon Street, for one-story addition. Cost close to $100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 26 for one electric arc welding set (Schedule 9774), 350 doz. hacksaw blades (Schedule 9805) for Brooklyn Navy Yard; until Jan. 29, steel expansion joints (Schedule 9810) for Brooklyn and Philadelphia yards; 177,426 lb. of nickel-steel forgings (Schedule 9780) for Brooklyn and Puget Sound yards; until Feb. 2, electric cable (Schedule 9791) for Brooklyn, Puget Sound and Mare Island yards.

Standard Oil Development Co., 26 Broadway, New York, an interest of Standard Oil Co. of New Jersey, same address, has plans for one-story addition to plant at Bayway refinery, Linden, N. J., of last noted company. Cost over $50,000 with equipment. Company will also erect addition to office and operating building at same location to cost close to like sum.

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, has let general contract to Fiske-Carter Construction Co., Masonic Temple Building, Greenville, S. C., for additions to branch plant at Valdosta, Ga. Cost over $500,000 with equipment. Company has acquired plant and business of Charles H. Stone, Inc., Charlotte, N. C., manufacturer of chemicals, for new branch plant at that place.

Borden Co., 350 Madison Avenue, New York, milk products, has plans for remodeling recently acquired six-story building at 615 West 131st Street for pasteurizing, mechanical-bottling, storage, etc. Cost over $275,000 with machinery. W. H. and J. F. Dusenbury, 10 East Fortieth Street, are architects and engineers.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Jan. 29 for 127,000 ft. of cable and 127 reels (Circular 101).

Charles Kreymborg, 349 East 149th Street, New York, architect, has plans for one-story machine shop on Hunts Point Avenue, to be occupied by company whose name is temporarily withheld. Cost close to $45,000 with equipment.

Acro Trades, Inc., Roosevelt Field, Garden City, N. Y., plans rebuilding airplane hangar with shop and service facilities, recently destroyed by fire. Loss about $30,000 with equipment.

Canada Dry Ginger Ale, Inc., 122 East Forty-second Street, New York, plans new plant in Texas, on site to be selected. Cost over $100,000 with equipment. Company has begun work on new branch plants at Philadelphia, Pittsburgh, Omaha, Neb., and Winnipeg, Man., each to cost about $100,000 with machinery.

Quartermaster, West Point, N. Y., asks bids until Jan. 25 for wire and cable, safety switches and other electrical equipment (Proposal 955-74).

Wallace & Tiernan Co., 11 Mill Street, Belleville, N. J., manufacturer of water and sewage purification machinery, etc., has let general contract to Mahony-Troast Construction Co., 657 Main Avenue, Passaic, N. J., for three one-story additions, totaling about 100,000 sq. ft. floor space. Cost close to $250,000 with equipment. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Commanding Officer, Ordnance Department, Delaware Ordnance Depot, Delaware, N. J., asks bids until Jan. 27 for one turret lathe (Circular 13).

Upson-Walton Co., 1310 West Eleventh Street, Cleveland, manufacturer of wire rope, ship chandlery, etc., has acquired controlling interest in Belleville Wire Rope Co., 691 Main Street, Beleville, N. J., and will consolidate. Belleville plant will be used for new Eastern branch and expansion carried out, including installation of additional equipment.

Art Tube Co., 8 Renee Place, Irvington, N. J., manufacturer of collapsible metal tubing, etc., has plans for new one-story and basement plant, 145 x 150 ft. Cost close to $100,000 with equipment. John T. Simpson, 744 Broad Street, Newark, is architect.

Board of Education, Administration Building, Parkway and Twenty-first Street, Philadelphia, plans manual training department in new three-story boys' central high school, 200 x 350 ft., at Roosevelt Boulevard and York Road. Cost $2,444,000, of which $1,100,000 is being secured through Federal grant. Irwin T. Catharine is architect for board.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Jan. 25 for four universal tool and cutter grinders (Circular 343); until Jan. 26, 1030 manganese bronze forgings (Circular 322), 40 transformers (Circular 349); until Feb. 1, 7500 ignition cartridges (Circular 399).

Wilmington Abattoir Co., Inc., Wilmington, Del., recently organized, has taken over property, 40,000 sq. ft. floor space, at 16-20 Tatnall Street, and will remodel for new meat-packing plant.

BUFFALO DISTRICT

Union Carbide Co., Niagara Falls, N. Y., has filed plans for one-story addition, 77 x 200 ft., primarily for storage and distribution. Cost close to $50,000 with equipment.

Niagara-Hudson Power Corp., Electric Building, Buffalo, operating Buffalo General Electric Co. and other electric power utilities, plans expansion and improvements in plants and system to cost about $10,000,000. Of this sum, approximately $5,000,000 will be expended in Buffalo area, including transmission lines for rural electrification, power switching and substations, and other structures.

Phoenix Brewery Corp., 300 Emslie Street, Buffalo, has asked bids on general contract for one-story addition, to be used in part for storage and distribution. Cost close to $60,000 with equipment. Julius C. Schultz & Sons, 1370 Main Street, are architects.

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 26 for 502,000 brass tubes, and 32,130 lb. brass tubing (Schedule 9763); until Jan. 29, alloy steel forgings (Schedule 9794) for Newport, R. I., Navy Yard.

Hartford Electric Steel Co., 540 Flatbush Avenue, Hartford, Conn., has let general contract to Peter A. Bell, 25 Abbotsford Avenue, for one-story addition, 20 x 100 ft. Cost over $40,000 with equipment.

Bard Parker Co., Leemac Avenue, Danbury Conn., manufacturer of surgeons' knives and kindred specialties, has plans for one-story addition, 55 x 90 ft. Cost about $45,000 with equipment. E. B. Watson, 20 West Street, is architect.

Cape Cod Ship Building Corp., Wareham, Mass., specializing in construction of pleasure craft, has been acquired by new interests, headed by Harvey L. Williams, Greenwich, Conn., who will be president of company. Expansion will be carried out, to include construction of large yachts and miscellaneous sea craft.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Jan. 25 for side milling cutters, helical cutters, drills, reamers, hacksaw blades, pipe-threading equipment, electric grinder, etc. (Circular 124).

Loring Coes Co., Coes Street, Worcester, Mass., manufacturer of machine knives, wrenches and kindred tools, has let general contract to E. J. Cross Co., 82 Foster Street, for two one and two-story additions, to replace buildings recently destroyed by fire, and for improvements in other structures. Cost over $75,000 with equipment.

Rowland Marine Products Co., 255 Northern Avenue, South Boston, has plans for a one-story factory, 50 x 102 ft.

Cape Ann Anchor Works, Gloucester, Mass., will build a new plant, 55 x 160 ft., to replace one destroyed by fire.

WASHINGTON DIST.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for crane for installation on pontoon at navy yard, Pearl Harbor, T. H. (Specifications 8340); bids (no closing date stated) for motor-driven centrifugal pump and accessories, steel supporting structure for 6000-kw. turbo-alternator unit, piping systems and other work at power house, navy yard, Norfolk, Va. (Specifications 8243).

United Distillers of America, Ltd., 2700 Wilmarco Avenue, Baltimore, has let general contract to Jerome J. Gebhart, 3408 Calloway Avenue, for one-story addition and improvements in present plant. Cost over $50,000 with equpiment. Benjamin Frank, 15 West Franklin Street, is architect.

Contracting Officer, Office of Chief of Engineers, Munitions Building, Washington, asks bids until Jan. 26 for one 7000-lb.

gasoline engine-driven tractor-type crane (Circular 28).

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 29 for one gasoline engine-driven industrial tractor with cab, 14 four-wheel steel trailers for use with electric trucks or tractors, one direct-connected mechanical blower, 33,000 ft. copper wire, 11,300 ft. galvanized steel wire cloth, galvanized turnbuckles, brass bolts, machine bolts, carriage bolts, steel nuts, steel grip nuts, hexagonal nuts, steel rivets, iron or steel plate washers, one 42-in. diameter grindstone and other equipment (Schedule 3217).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 26 for one motor-driven power squaring shear (Schedule 9767), one motor-driven die-sinking and engraving machine (Schedule 9768), 50,400 lb. steel wool (Schedule 9760), fuel oil meters (Schedule 9784), electric cable (Schedule 9788), one motor-driven combination band resaw and scroll saw (Schedule 9766), bolts, screw eyes, catches, grommets, etc. (Schedule 9738), coil and weldless chain (Schedule 9769), locks and latches (Schedule 9756), about 160,000 sq. ft. copper wire cloth, 37,800 sq. ft. galvanized iron or steel wire cloth, 800 sq. ft. brass wire cloth (Schedule 9761); until Jan. 29, molybdenum alloy steel tubing (Schedule 9800) for Eastern and Western navy yards.

SOUTH ATLANTIC

St. Joe Paper Co., Port St. Joe, Fla., recently organized as an interest of Mead Corp., Chillicothe, Ohio, manufacturer of paper products, and Alfred I. duPont Estate, Jacksonville, Fla., has let general contract to James Stewart & Co., Inc., 230 Park Avenue, New York, for new pulp and paper mill at first-noted place, with machine shop, power house, pumping station and other mechanical structures. Cost about $6,500,000 with machinery. Company will secure pine wood for pulp in districts in Florida, Georgia and Alabama, and will build sawmills and mechanical-handling plants for this service. Dock and harbor facilities will be constructed at plant site, with development of new townsite for mill operatives. Entire project will cost in excess of $15,000,000. Work is scheduled to begin early in February. George H. Mead, president of Mead Corp., is one of heads of new company. George F. Hardy, 305 Broadway, New York, is consulting engineer.

Georgia Packing Co., Thomasville, Ga., canner and packer of food products, has approved plans for new one-story packing plant, with power house and other mechanical structures. Cost close to $700,000 with equipment.

SOUTH CENTRAL

Lehon Co., West Forty-fourth Street and South Oakley Avenue, Chicago, manufacturer of roofing products, is considering new branch plant at North Memphis, Tenn. Cost over $150,000 with equipment. A. G. Leonard is president.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Jan. 29 for electrical conductor wire and cable for rural electrification in Tennessee Valley area, totaling about 550 miles; until Feb. 3, 43 double-circuit steel towers and accessories for new transmission line between Pickwick dam power plant and Memphis, Tenn. Authority is arranging budget of $4,700,000 for fiscal year for new transmission and distributing lines in Tennessee Valley district; $300,000 for electrical distributing stations and properties, and $100,000 for miscellaneous electrical equipment.

Compressed Industrial Gases, Inc., 221 North La Salle Street, Chicago, manufacturer of industrial oxygen, acetylene, welding equipment, etc., has approved plans for new one-story branch plant at Shreveport, La. Cost over $40,000 with equipment.

Flintkote Co., 50 West Fiftieth Street, New York, manufacturer of roofing products, has plans for one-story factory branch, storage and distributing plant, 70 x 115 ft., at Poland and Galvez Streets, New Orleans. Cost close to $50,000 with equipment. Billingsley Engineering Co., Interstate Bank Building, New Orleans, is engineer.

SOUTHWEST

S. G. Adams Metalware Co., 2940 Franklin Street, St. Louis, manufacturer of sheet and pressed metal products, has asked bids on general contract for one-story addition, 58 x 62 ft. Cost over $40,000 with equipment. Charles H. Deitering, Title Guarantee Building, is architect; Koerner Engineering Co., Syndicate Trust Building, is engineer.

Missouri Pacific Railroad Co., Missouri Pacific Building, St. Louis, plans new engine house with shop facilities at Atchison, Kan. Cost over $100,000 with equipment. W. L. Wonson, address noted, is assistant chief engineer.

St. Louis Independent Packing Co., 3815 Chouteau Avenue, St. Louis, meat packer, asks bids on general contract until Jan. 25 for extensions and improvements in plant, including group of nine buildings. New equipment will be installed. Cost over $150,000. Company is affiliated with Swift & Co., Chicago.

United States Engineer Officer, Kansas City, Mo., asks bids until Feb. 4 for one duplex-type twin pumping set for fuel oil service (Circular 373).

Board of Education, Library Building, Kansas City, Kan., George Widder, clerk, asks bids until Feb. 1 for sheet metal, woodworking, machine and other tools for automobile, electrical and other shops of Wyandotte high school. Hamilton, Fellows & Nedved, 814 North Tower Court, Chicago, are architects.

City Council, Brenham, Tex., has been authorized to arrange bond issue of $190,000, to which will be added Federal grant to make total fund of about $300,000 for new municipal electric power plant. Installation will include four 250-kw. diesel engine-generator units, oil tanks and auxiliary equipment, and electrical distributing facilities.

Nehi Bottling Co., Beaumont, Tex., has plans for one and two-story mechanical-bottling plant, 70 x 100 ft. Cost close to $40,000 with equipment.

OHIO AND INDIANA

Linderme Tube Co., 1291 East Fifty-third Street, Cleveland, manufacturer of copper and other metal tubing, has acquired tract on East 219th Street for new plant, on which work will begin in spring. Cost over $50,000 with equipment.

Forest City Brewery, Inc., 6900 Union Avenue, Cleveland, has plans for one and multi-story addition, totaling 30,000 sq. ft. floor space. Cost close to $125,000 with equipment. Richard F. Outcalt, 3575 Gridley Road, is architect and engineer.

Truscon Steel Co., Youngstown, manufacturer of sectional steel buildings and other steel building products, has plans for one-story addition. Cost about $55,000 with equipment.

Airtemp, Inc., Dayton, Ohio, manufacturer of air-conditioning equipment and parts, a subsidiary of Chrysler Corp., Detroit, will carry out plant expansion and improvements, including additional machinery. Cost over $200,000 with equipment.

Murray-Ohio Mfg. Co., 1115 East 152nd Street, Cleveland, manufacturer of sheet metal stampings, steel toys and allied products, has leased about 20,000 sq. ft. floor space for expansion, in building at 1190 East 152nd Street.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Jan. 25 for 5000 valve assemblies (Circular 444), bomb rack front retainer plunger brackets, mount assemblies of flexible gun type, long bomb rack terminal posts, short bomb rack terminal posts, blast tube assemblies, gun mount brake tension springs, bomb release handle stop assemblies, bomb release handle springs (Circular 442); until Jan. 26, altimeters (Circular 405); until Jan. 29, 14 supercharger regulators (Circular 451).

Indiana Farm Bureau Co-operative Association, Inc., 309 Washington Street, Indianapolis, is considering two-story oil refinery on local site, on which it is proposed to begin work early in spring. Cost about $150,000 with steel tank storage and distributing facilities.

Board of Public Works, Valparaiso, Ind., plans electrification of municipal waterworks station, with installation of two diesel engine units, motors and control equipment for pumps, 500,000-gal. elevated steel tank and tower, and other equipment. Bond issue for $160,000 has been voted for project. Charles Brossman, Chamber of Commerce Building, Indianapolis, is consulting engineer.

MICHIGAN DISTRICT

Masco Screw Products Co., 2700 Franklin Street, Detroit, has plans for one-story addition, with equipment to increase present output about one-third. Cost over $50,000 with machinery.

Peter Eckrich & Sons Co., Fort Wayne, Ind., meat packer, has let general contract to Davis-Miller Co., Kalamazoo, Mich., for new one-story plant at Kalamazoo. Cost over $45,000 with equipment.

Norge Corp., Muskegon, Mich., manufacturer of electric refrigerators, plans one and two-story additions and construction of top story on buildings Nos. 7 and 8 in plant at Muskegon Heights. Cost over $100,000 with equipment. Company is a division of Borg-Warner Corp., Chicago.

No-Sag Spring Co., 4845 Bellevue Avenue, Detroit, manufacturer of steel springs, plans installation of additional equipment for considerable increase in present output. Company has taken over property at Windsor, Ont., and will remodel for branch plant, to be operated by a subsidiary, No-Sag Spring Co., Ltd., recently organized.

Grand Rapids Varnish Corp., Grand Rapids, Mich., has plans for two-story addition, 60 x 100 ft. Cost about $55,000 with equipment.

Dallas E. Winslow, Inc., 1331 Holden Street, Detroit, operating industrial properties, has acquired plant and business of Prima Co., Sidney, Ohio, manufacturer of washing machines and parts, from referee in bankruptcy, and will operate as a unit of organization.

MIDDLE WEST

F. Mattern Mfg. Co., 4140 North Kolmar Avenue, Chicago, manufacturer of X-ray equipment and parts, will ask bids soon on general contract for new one-story and basement plant on North Cicero Avenue. Cost close to $40,000 with equipment.

Chicago Transformer Corp., 3501 West Addison Street, Chicago, manufacturer of electrical transformers and parts, has plans for one-story addition, about 20,000 sq. ft. floor space. Cost close to $50,000 with equipment. L. G. Hallberg, 121 West Wacker Drive, is architect.

City Council, Rochester, Minn., has asked bids on general contract for one and two-story municipal equipment storage and distributing building, 60 x 120 ft. Cost about $40,000 with equipment. Financing has been arranged through Federal aid. Peter P. Bross, 19½ S.W. Second Street, is architect; A. C. Smith is city engineer.

Magnus Metal Co., 2945 Blake Street, Denver, manufacturer of metal products, has let general contract to William Tamminga, Tramway Building, for one-story addition, 100 x 180 ft. Cost over $75,000 with equipment.

City Council, Forest City, Iowa, asks bids until Feb. 3 for municipal electric power plant, including three diesel engine-generator units with combined capacity of 975 hp., and accessories, oil tanks, cooling tower, switchboard and other equipment. Cost about $165,000. Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

Coca-Cola Bottling Co. of Chicago, Inc., 1101 West Congress Street, Chicago, plans two-story mechanical-bottling plant at Ravenswood and Montrose Avenues. Cost over $60,000 with equipment.

Minneapolis-Honeywell Regulator Co., Fourth Avenue South, Minneapolis, has let general contract to C. F. Haglin & Sons, Inc., National Building, for three-story addition, 75 x 200 ft. Cost close to $150,000 with equipment. Edward Prondzinski, Pence Building, is architect.

Exeter Foundry & Machine Co., Exeter, Neb., plans new one-story foundry and

machine shop, 55 x 75 ft., at Hastings, Neb. Cost about $40,000 with equipment. Present works will be removed to new location and capacity increased.

West Allis, Wis., Board of Vocational Education, H. S. Belman, director, closes bids Jan. 28 for third unit of vocational school, estimated to cost $100,936. Robert A. Messmer & Brother, 231 West Wisconsin Avenue, Milwaukee, are supervising architects.

Solar Corp., 944 West Bruce Street, Milwaukee, contemplates erection of additional unit, 80 x 157 ft., six stories and basement, at Cudahy. Preliminary plans are being made by Robert H. Smith, consulting engineer, 5920 West North Avenue, Milwaukee.

Wisconsin Telephone Co., 722 North Broadway, Milwaukee, affiliated with Bell System, has appropriated approximately $4,000,000 to provide for construction and replacement of telephone plant during 1937. George F. Crowell is chief engineer.

Milcor Steel Co., 4100 West Burnham Street, Milwaukee, a subsidiary of Inland Steel Co., Chicago, plans expansion program in Milwaukee and at branch factory in Canton, Ohio, costing approximately $1,000,000. Some new lines will be added to present line of sheet metal building materials.

Heil Co., 3000 West Montana Street, Milwaukee, manufacturer of motor truck body and hoist equipment, tanks, oil burners, etc., has set aside $500,000 of surplus earnings for works expansion. Immediate investment will amount to $250,000 for buildings and machinery, remainder awaiting expenditure if Federal surplus tax situation is remedied.

Wisconsin Public Service Corp., 1029 North Marshall Street, Milwaukee, has approved 1937 construction budget of $1,570,860, including $480,000 for new dam and generating plant at Tomahawk, Wis., and $627,000 extensions and replacements in distribution systems of electrical and gas divisions.

WESTERN PA. DIST.

Pennsylvania Electrical Repair Co., 129 First Avenue, Pittsburgh, operating electrical repair works, including parts manufacture, etc., has plans by Paul R. Scheuneman, Magee Building, architect, for one and two-story plant, 170 x 175 ft., on site recently acquired on Sawmill Run Boulevard. Cost close to $75,000 with equipment.

Bradford Oil Refining Co., Bradford, Pa., plans extensions and improvements in refinery, including additional equipment. Financing is being arranged to net over $770,000, considerable part of fund to be used for purpose noted.

Wayne Brewing Co., 1701 Parade Street, Erie, Pa., has let general contract to Henry Shenk Co., 1644 East Twelfth Street, for one-story addition for storage and distribution. Cost close to $45,000 with equipment.

PACIFIC COAST

Union Oil Co., 220 Montgomery Street, San Francisco, plans additions to oil refinery at Oleum, Contra Costa County, Cal., including cracking plant machinery for gasoline production and other equipment, additional steel tank storage and other facilities. Cost about $1,900,000. Company has arranged for bond issue of $10,000,000 to provide in part for project.

United States Gypsum Co., 816 West Fifth Street, Los Angeles, has let general contract to Myers Brothers, 3407 San Fernando Road, for one-story and basement addition to plant at 8430 Quartz Avenue, 100 x 410 ft. Cost close to $175,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 26 for insulated electric cable for arc welding (Schedule 9771) for Mare Island Navy Yard; steel strapping for packing cases (Schedule 9790) for Mare Island and other yards; two motor-driven upright drill presses (Schedule 9749) for Western or Eastern yards.

J. N. Locke, 2100 West Anaheim Street, Long Beach, Cal., has let contract for superstructure to Long Beach Iron Works, 2020 West Anaheim Street, for one-story foundry, 35 x 80 ft. A runway will be built for yard crane. Cost close to $30,000 with equipment.

United States Engineer Office, Second District, Portland, Ore., asks bids until Jan. 29 for control equipment for operation of swing bridge and navigation lock at Bonneville, Ore., project (Circular 208).

Washington Water Power Co., Spokane, Wash., plans extensions and improvements in plants and system, to cost about $1,250,000, including new transmission line from Moscow to Orofino, Wash., about 50 miles, with power substation and switching station at latter place, and new transmission line from Hartline to Almira, Wash.; also lines for rural electrification, with service facilities. Of fund noted, about $100,000 will be expended for meters and metering equipment for rural lines.

Swift & Co., 2691 East Vernon Avenue, Vernon, Los Angeles, meat packers, have let general contract to Robert E. Millsap, Pacific Commerce Building, for two additions to edible oil refinery at Vernon, four stories, 36 x 114 ft., and two stories, 40 x 40 ft. Cost over $125,000 with equipment. Company headquarters are at Chicago.

FOREIGN

Japan Dye Mfg. Co., Torishima, Osaka, Japan, operating with capital of 15,000,000 yen (about $4,250,000), plans new works at Kasugade, Osaka, for refining crude naphthalene, with steel tank storage and distributing department, power house, pumping station and other mechanical units. Cost over $750,000 with equipment.

National Refineries Co., Ltd., Dublin, Ireland, organized recently with capital of £1,000,000 ($5,000,000), has plans for oil refinery on local site, including storage and distributing division, to be operated by Liffey Trading Co., Dublin, an affiliated interest. Plant will include steel tank storage department, power house and pumping station. Cost over $1,500,000 with equipment. London & Thames Oil Wharves, London, England, is interested in new organization, T. C. J. Burgess being chairman of board of both companies.

McKinnon Industries, Ltd., St. Catharines, Ont., manufacturer of chains and other mechanical products, plans one-story foundry addition. Cost close to $60,000 with equipment. A. E. Nicholson, 46 Queen Street, is architect.

American Management Association To Discuss National Labor Problems

WITH labor crises developing rapidly on a nationwide front, the American Management Association has issued a call to 2182 companies in its membership and to industry at large to attend a conference in Philadelphia on Feb. 9, 10 and 11. It is expected that from this conference will emerge plans and policies which will have a settling effect on the chaotic conditions existing in a number of the country's major industries.

The association is taking a serious view of the situations developing in industrial centers throughout the country, it stated through its president, Alvin E. Dodd.

"Recent events have brought forward so many new problems that thousands of business men who ask nothing better than the chance to give their employees a fair deal are thoroughly confused," Mr. Dodd said. "Within the limits set by legislation, politics, public opinion, and the highest ethical standards, they are anxious to do the right thing, whatever that may be, but at the same time not put their enterprises in a hopeless position of disadvantage.

"In the fair and enlightened atmosphere which it is hoped will prevail at this conference, and with the light of the experiences of those present who have successfully solved parts of this great problem in their own organizations, much of the current confusion can be dispelled, to be replaced by a definite sense of what are sound and practical methods."

Committees from the association, directed by Thomas G. Spates, director of industrial relations of General Foods Corp., have been preparing the program, which will be staged with the cooperation of the Philadelphia Chamber of Commerce and the Philadelphia Personnel Association at the Benjamin Franklin Hotel.

Among those who will make reports and recommendations on personnel policies and procedures are: Virgil Jordan, president of the National Industrial Conference Board; Clarence G. Stoll, vice-president, Western Electric Co., Inc.; J. W. Dietz, superintendent of industrial relations, Western Electric Co., Inc., Kearny; W. H. Winans, industrial relations department, Union Carbide Co.; C. S. Ching, United States Rubber Co.

Mr. Dodd stated today that it will be emphasized at the outset of the meeting that industrial relations is the principal business problem of 1937. "It is no longer a mere phase of general management," he said, "but general management's principal problem."

The association advised its members that the conference would be conducted largely on a laboratory basis, with discussion of specific employer-employee situations.

Among the subjects that will come under discussion are: the formulation of labor policy; employee representation; trade union agreements; technique of wage negotiations; problems of personnel administration in connection with social security; the development of executive ability in a business organization; and others.

Durable Goods Sharing Fully in Recovery

(CONTINUED FROM PAGE 27)

about 45,000,000 sq. ft. per month and rose to a slightly higher level in 1929. The sharp decline during the next four years brought the monthly average of contract awards down to a little more than 5,000,000 sq. ft. in 1932. Instead of recovering after that year, however, residential building continued to decline in 1933 and again in 1934. A sharp gain to more than 11,000,000 sq. ft. occurred in 1935 with another increase to 18,000,000 sq. ft. in 1936, and there is now ample evidence that 1937 will witness further substantial improvement. Non-residential construction also showed encouraging improvement in 1936 to more than two and a half times the 1933 low point. Since the construction industries are normally responsible for an enormous volume of railroad traffic, a higher rate of building activity will not only benefit capital goods directly, but indirectly, through increased demand for railroad equipment.

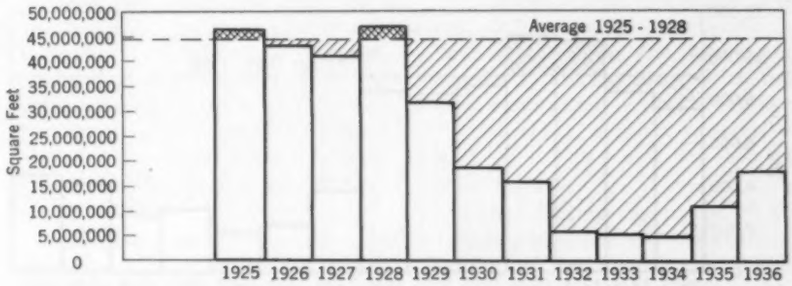
Non-ferrous metal industries have shared to a substantial extent in the general recovery of the capital goods industries. Zinc production has increased steadily since 1932 and 1936 output was about equal to that of 1930. Expansion in the lead industry has been less pronounced. Shipments of lead ore from the Joplin district increased in 1933, fell off again in 1934, and reached higher levels in 1935 and 1936 with the latter year, however, at less than half the pre-depression rate.

Huge Latent Demands Still Exist

Encouraging though the recent recovery in the heavy industries has been, it has filled but a fraction of the huge latent demand for capital equipment represented by deferred maintenance and replacement during the seven lean years of depression. A rough measure of the magnitude of the shortages accumulated during the depression is provided by the lightly shaded areas on the charts which show the extent to which operations in recent years have fallen below the average rate of activity during the years from 1923 to 1928. Obviously this is only a crude statistical measure of "potential demand," which provides no assurance of future prosperity in any specific industry. Some of the industries shown in the charts may never again attain former levels, while others are destined to expand operations far beyond the "normal expectation" represented by the average of pre-depression years.

For most industries, however, the average rate prevailing a decade ago probably errs on the side of pessimism rather than optimism in forecasting what may be expected in the future. A population that is still growing, though at a less rapid rate than in the past, a rising standard of living and increased mechanization all indicate a steadily rising trend in the use of both capital equipment and consumers' durable goods.

Taken in the aggregate, there-



CONTRACTS AWARDED FOR RESIDENTIAL BUILDINGS—FLOOR SPACE (Monthly Averages). Includes one and two-family dwellings, apartments and hotels. Compiled by the F. W. Dodge Corp. from actual contract records in 37 states east of the Rocky Mountains, probably representing nearly 90 per cent of the total for United States. Published currently by United States Department of Commerce in the Survey of Current Business.

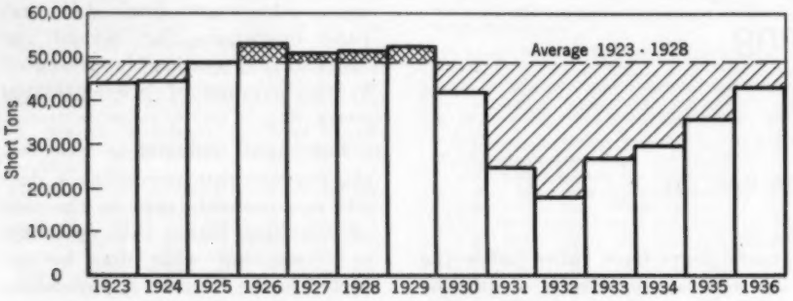
12. AN EIGHT LETTER WORD MEANING TOOLS THAT TURN OUT THE WORK

Illustrated — top, No. 300 Series General Purpose Pneumatic Grinder; bottom, No. 21D high speed High Frequency Electric Drill.

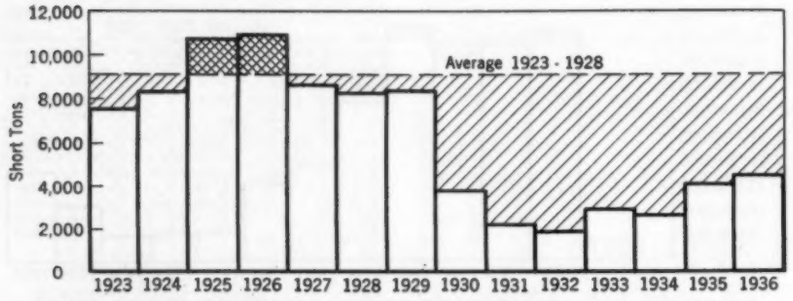
You will not have to consult the dictionary for this one. Any operator of portable production tools in thousands of shops the industrial world over could fill it in—and not be guessing!

HERCULES Tools do *turn out the work.* They are *overstrong* for the extra demand made on them; simple in design—easy to maintain; ruggedly constructed; fundamentally right in principle . . . And a complete line of Grinders, Sanders, Polishers, Drills, Screwdrivers and Nut Runners in both Pneumatic and High Frequency Electric types to serve your every need.

THE BUCKEYE PORTABLE TOOL CO. DAYTON, OHIO — HERCULES



ZINC—PRODUCTION (Monthly Averages). Data compiled by American Zinc Institute. Published currently by United States Department of Commerce in the Survey of Current Business.



LEAD ORE—SHIPMENTS (Monthly Averages). Shipments of lead ore from the mines of the Joplin district from the *Joplin Globe*. Published currently by United States Department of Commerce in the Survey of Current Business.

fore, these factors together with the evidence of existing shortages shown in the charts, undoubtedly reflect a potential demand for structures, machinery and equipment far in excess of any that has ever before existed. At the pre-depression rate of operations from one to two years' production would be required to fill the indicated shortages for machine tools and automobiles. From two to three years' operations at the normal rate would be required to supply accumulated needs for iron and steel products, steel sheets, fabricated steel plate, malleable castings, industrial electric trucks and tractors and zinc products. In the case of steel boilers, electric overhead cranes, industrial electric locomotives, freight cars and the other products shown in the charts more than four years' operations would be required to supply accumulated needs.

Effects of New Corporate Earnings Tax

How soon these deferred needs will be translated into orders on the books of producers is a more difficult question to answer. Durable or capital goods, whether machinery and equipment purchased by industry or new houses and automobiles bought by consumers, involve an investment of capital rather than a charge against current income. They are paid for either out of savings in the form of corporate surpluses or the bank accounts of individuals, or more often, by means of a loan to be repaid out of future savings. The recovery in capital goods which has occurred thus far appears to have been based almost entirely on expenditures of corporate surpluses since very few new capital issues have been floated during the past four years. At the peak of the boom, in 1929, corporate new capital issues averaged $667,000,000 per month and the average monthly total from 1923 to 1928 was about $320,000,000. From these levels they fell to little more than $13,000,000 per month in 1933. A substantial increase since that year brought the monthly average to about $89,000,000 in 1936, but this is still only a small fraction of the pre-depression volume.

Whether the capital goods recovery could be carried much further by purchases made out of corporate surpluses would be doubtful even without the changed situation brought about by recent tax legislation. The tax on undistributed earnings, of course, will tend to force a larger distribution of corporate income as dividends to stockholders. This means that future purchases of new equipment and plant expansion programs will have to be financed chiefly out of new capital issues instead of corporate savings.

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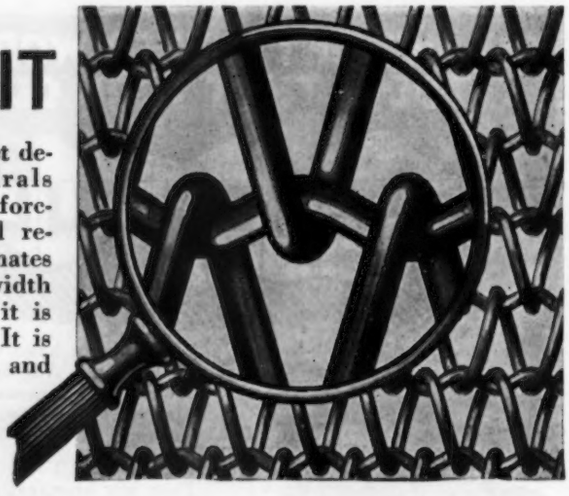
The most flexible belt yet devised, because the spirals work freely on the reinforcing strut. The crimped reforcement member eliminates tendency to shrink in width and elongate. Because it is balanced, it runs true. It is available in all sizes and kinds of wire to suit your needs. Request full particulars.



WICKWIRE SPENCER STEEL COMPANY

New York City Worcester Buffalo Chicago San Francisco

WISSCO CONVEYOR BELTS

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How to Weld Twenty-Nine Metals

(CONTINUED FROM PAGE 33)

fore welding. The second method consists of subsequently annealing the welded joint. Annealing temperatures of 1200°F. will be effective, although higher temperatures will have a more pronounced effect.

Local annealing by welding has been found very effective in reducing hard areas when it is properly carried out. The theory is that a subsequent layer will anneal the previous layer of weld metal. If, instead of stopping a weld flush with the surface of a casting, several additional layers are deposited to reinforce it, they will effectively anneal the area next to the weld at the surface of the casting. Excessive puddling and excessive currents will assist greatly in these annealing operations.

When patching sand holes in steel castings, it is essential that all porous and spongy metal and sand be removed. If this is not done, poor fusion will be obtained. Sand inclusions will also cause trouble from poor fusion in cases where oil-tight welding is required.

Cast Iron

Most commercial cast irons contain between 2.50-3.75 per cent of total carbon, 0.3-3.0 per cent silicon, up to 1.5 per cent phosphorus, 0.4-1.0 per cent manganese, and less than 1.0 per cent sulphur. The carbon may be present in two forms—as graphite flakes dispersed throughout the metallic matrix; and combined with iron to form cementite. The percentages of combined and free carbon control the classification of cast irons and have a marked influence on their weldability.

Cast iron may be grouped broadly into three classes: (1) gray irons, (2) chilled irons, and (3) white irons.

Gray cast irons are irons having a gray fracture. They are readily machinable with ordinary tools and the combined carbon usually does not exceed 0.8 per cent.

Chilled cast irons are irons with some sections purposely chilled so fast that carbon is retained in the combined form (white cast iron) while other sections are allowed to cool slowly to form gray cast iron. Between the chilled and gray iron portions lies a region of so-called mottled iron in which some areas are white and some gray cast iron.

White cast irons are irons having a white fracture. They are very hard and difficult to machine. The carbon is practically all in the form of iron carbide (cementite) and the casting is extremely hard and brittle. White irons are used mostly in the production of malleable castings.

Malleable iron is white cast iron that has been given a special annealing process so that the final structure of the casting consists of ferrite and free carbon in the form of temper carbon with substantially no combined carbon in the form of free cementite (Fe_3C) or pearlite ($Fe_3C + Fe$).

When welding this material, the heat of welding causes the section adjacent to the weld to turn into cast iron which is hard and brittle. As a result, malleable iron must be treated as cast iron when it is arc welded and similar welding procedures used.

The percentage of free and combined carbon in cast irons is controlled primarily by the rate of cooling of the casting, and the percentages of silicon and nickel present. Sulphur may have some influence providing the manganese content is not too high. With normal manganese contents (0.4 to 1.0 per cent), sulphur contents as high as 0.1 per cent are entirely satisfactory.

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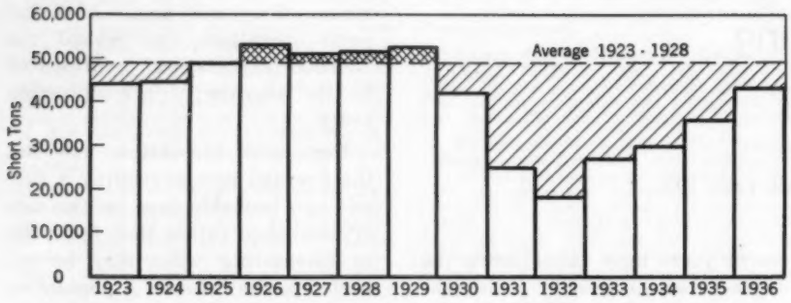

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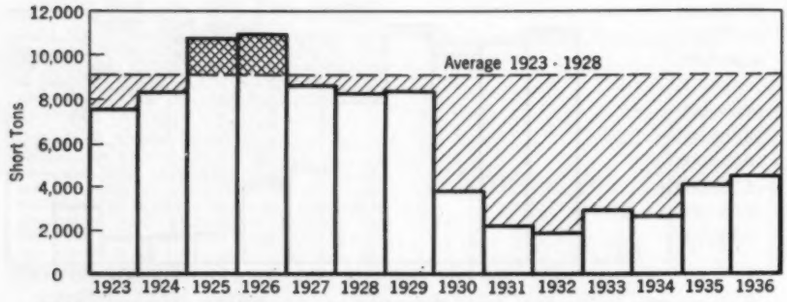

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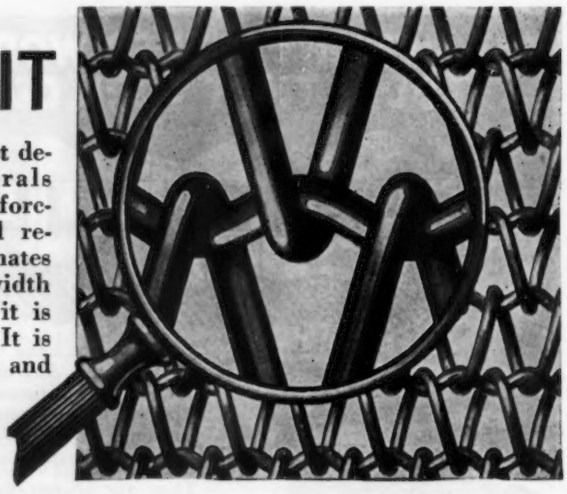

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time, the part is cooled rapidly, the cementite does not have sufficient time to decompose further, and as a result, white cast iron is obtained. If, however, slow cooling is continued and sufficient silicon is present, the cementite will break down into ferrite and graphite. The relative amounts of pearlite and ferrite plus graphite in any iron depends upon the silicon content and the cooling rate.

Nickel is usually added to gray iron in amounts from 0.25-5.0 per cent. It acts as a graphitizer and does not form a carbide. In small amounts it will reduce the chill and soften partially chilled iron by eliminating hard free carbides. This fact is very important from the standpoint of welding as will be discussed later. Nickel also aids machinability.

Weldability of Cast Iron

The weldability of cast irons is dependent upon their mechanical properties and metallurgical condition. All cast irons (excluding alloy cast irons) are relatively weak and brittle and will not withstand high thermal strains or residual stresses. As a result, special precautions must be taken to prevent cracks when welding.

When welding cast iron by the electric arc process, the fusion obtained is dependent upon the state in which the carbon exists. The closer the carbon approaches the graphitic state, the poorer will be the union of the metals. This condition is due to the fact that as the carbon approaches the graphitic state, there is less continuity of the iron matrix and less cohesion between the iron crystals. In addition, a layer of ashy and sandy residue is formed at the fusion zone and prevents the union of the metals. This condition becomes more serious as the carbon approaches the graphite state and is due to the inability of the molten metal to quickly dissolve the graphite flakes, leaving them exposed to the action of the arc and the air.

The application of coated electrodes has greatly eliminated the trouble of poor fusion resulting from the above-mentioned residue layer. The slag of the coating combines with this residue and assists in floating it to the surface, thus permitting a firm bond between the parts.

The degree of fusion that may be expected in cast iron can be foretold by striking a carbon arc on the casting preparatory to welding. If the metal becomes fluid when the arc is applied, and spreads over the base metal to the line of fusion, making a smooth appearance and even contact, instead of receding from the base metal at the edges of the line of fusion as though they were two foreign substances, good fusion can be expected.

When welding cast iron with ordinary steel electrodes, there is a hard brittle layer formed adjacent to the weld. This layer consists of chilled cast iron resulting from rapid cooling from the molten state. If the filler metal is a steel it will also absorb considerable carbon from the cast iron thus making it a high carbon steel. The effect of this hard area is to make it almost impossible to machine such a weld.

Welds of this type usually contain numerous small gas pockets in the layer adjacent to the casting. These holes are caused by the formation of gas resulting from the application of heat to the layer of graphite, dirt and slag, and by the volatilization of the carbon and silicon in the cast iron. There is also a tendency for cast iron to absorb moisture from the air upon being heated. This moisture, upon being gasified, may produce gas pockets.

When welding cast iron with the metallic arc, using steel filler metal, the difference in contraction between the molten deposited metal and the casting often causes trouble. The strength of the filler metal is much greater than that of the cast iron and upon contraction may pull away from the cast iron. In some cases, transverse cracks will be formed in the casting. These cracks will progress through the brittle weld deposit. Separation along the fusion line may occur even though good fusion is obtained.

In addition to the metallurgical conditions, there are many other causes for cast iron being unsuited for welding. Castings which have become impregnated with oil, water, and other agents resulting from service conditions will be found difficult to weld. In many cases, the casting will be deteriorated to such an extent that welding is absolutely impossible. In cases where the casting has absorbed quantities of water, oil, etc., it is essential that they be heated for a reasonable length of time prior to welding to adequately dry them out.

(To Be Continued)

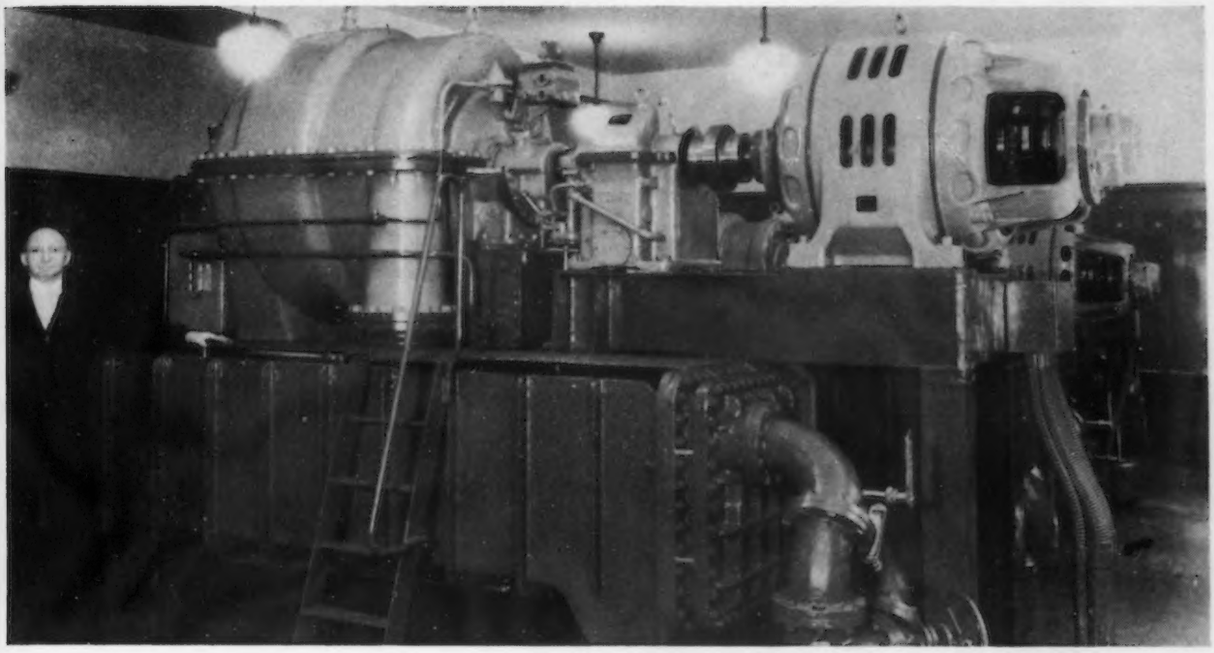

FIG. 29. Noel 100 per cent power factor 300 hp. slip-ring capacitor motor driving a large centrifugal compressor through a step-up gear.

o o o

Power Transmission

(CONTINUED FROM PAGE 35)

torque and current inrush classifications, including across-the-line starting; and in sizes up to 300 h.p., at either unity (100 per cent) or 80 per cent leading power factor. In addition to high-power factor operation these motors have high starting torque, take less starting current, and give increased efficiency with less slip (and consequently higher speed at all loads).

The Noel slip ring motor is so constructed that the condenser reactive current from the special built-in capacitor flows through the motor windings and thus produces a high power factor within the motor itself as well as greatly improving the efficiency and other operating characteristics of the motor and its drive. It operates at unity power factor at all loads from quarter load to 25 per cent overload. Under quarter loads the power factor is leading. It is also made in an 80 per cent power factor type which produces leading power factor up to 15 per cent at no load, making it an advantageous motor to use for power factor correction purposes. These motors are available in all sizes and speeds from 1 to 600 h.p., for 2 or 3 phase operation, 25, 30, 40, 50 or 60 cycles. Fig. 29 illustrates a 300 hp. Noel slip ring motor of 100 per cent power factor running at 1800 r.p.m. driving a large centrifugal compressor through a step-up gear.

Clutches

With the increasing demand for heavy machining operations, haz-

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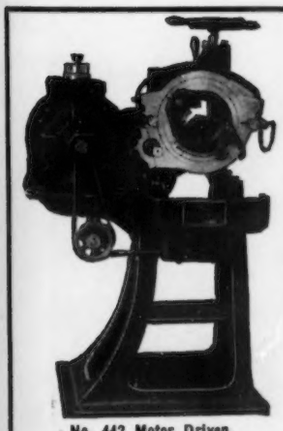

No. 442 Motor Driven. Range: ⅛ in. to 4 in.

Curtis **PIPE THREADING and CUTTING MACHINES**

LESS POWER TO OPERATE!

Weighs less than conventional machines and costs less. Threads bent pipe. The result of over 54 years of experience in perfecting the revolving-head machine.

Send for catalogue

The Curtis & Curtis Company

327 Garden Street **Bridgeport, Conn.**

No. 258 Motor Driven. Range: ⅛ in. to 6 in.

(CONTINUED FROM PAGE 103)

ards have increased for the operator. For the protection of the employee, as well as for accurate, speedy and absolute control of heavy work, the magnetic clutch and clutchbrake unit has provided an important development in the power transmission field.

Such a unit has recently been made available by the Stearns Magnetic Mfg. Co. As shown in Fig. 30, this is a rugged, yet highly sensitive device which incorporates smooth acceleration, the elimination of mechanical parts which require frequent replacement, and which gives quick, automatic stopping with positive safety at all times; especially in the event of an interruption in the electrical circuit. Being mechanically actuated by springs, the brake portion of the unit stops when the circuit is opened. One of these units recently completed an operating test of fourteen million engagements and disengagements without the replacement of any parts. A clear exposition of the design and construction features of magnetic

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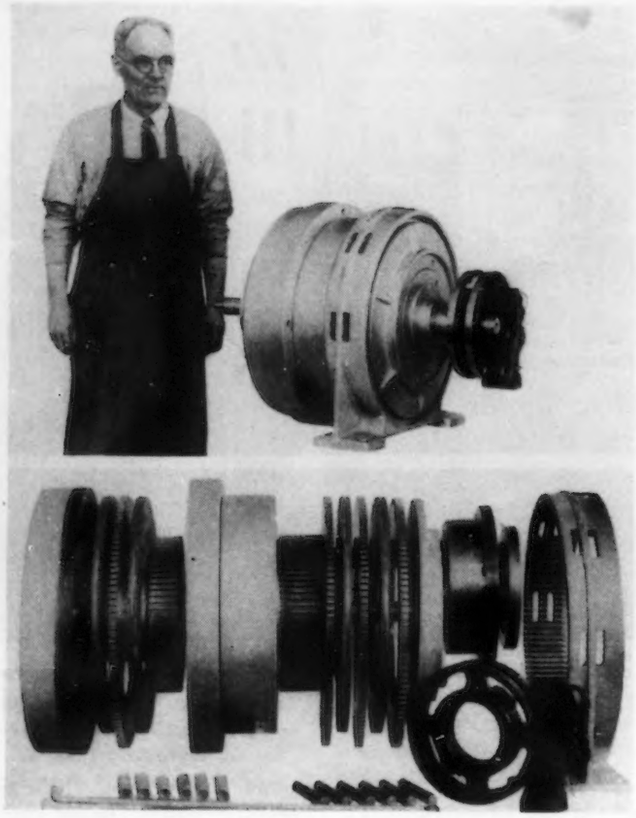

ABOVE

FIG. 30. Stearns heavy duty magnetic clutch and brake unit, with exploded view.

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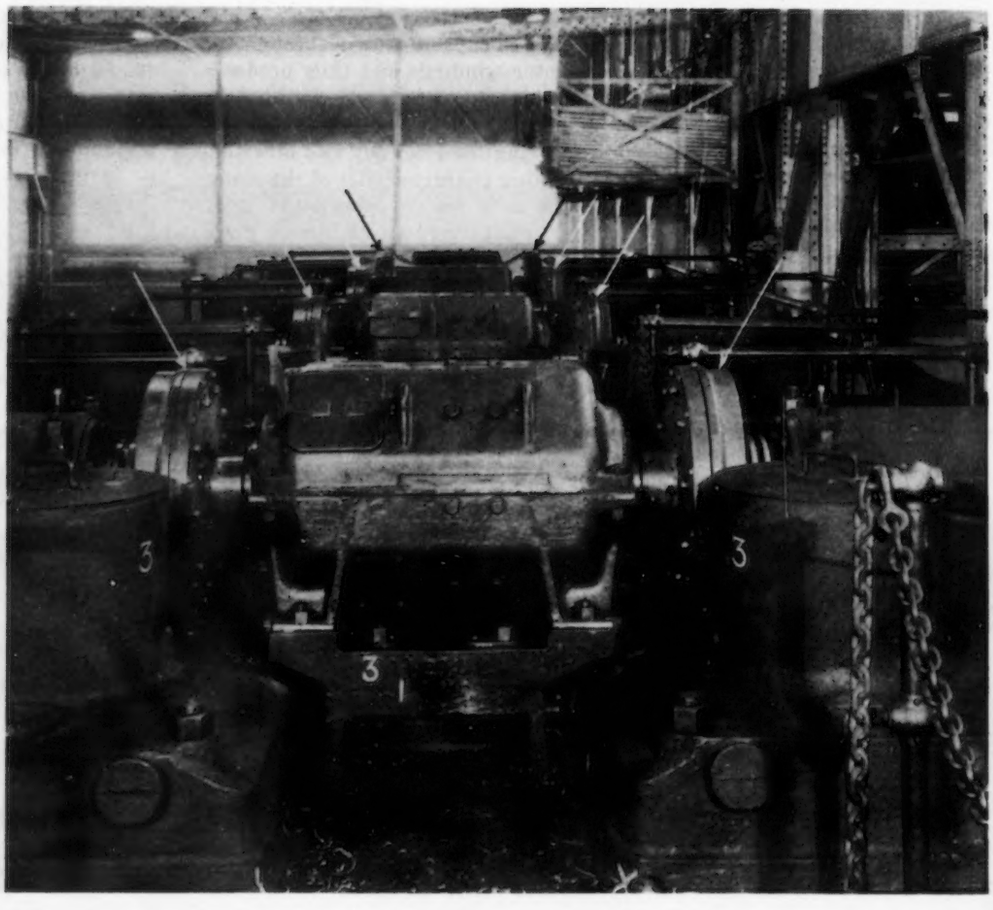
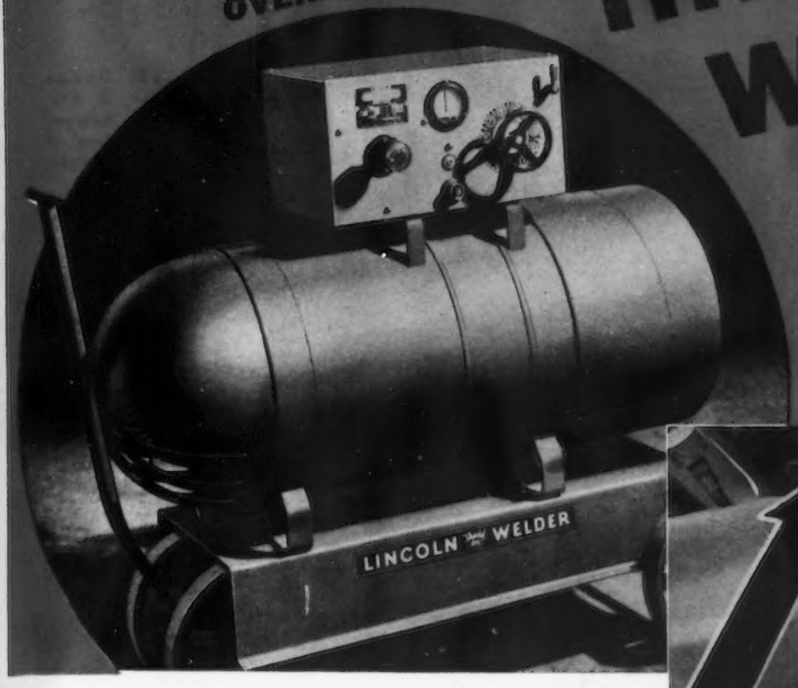


AT RIGHT

FIG. 31. Eight Stearns magnetic clutches on screwdowns of rolling mills.

LET THE STORM STRIKE!
LET A FUSE BLOW!
OVERLOAD IT!

THIS WELDER WILL NOT BURN OUT!



The motor windings of the "Shield-Arc SAE" welder will not burn out because they are protected from overheating by a unique control device.

The New "*Shield-Arc* SAE" is completely self-protecting

Here's how the New "*Shield-Arc SAE*" assures positive and complete protection from motor burnouts—

Starting—If any one of the phase lines is disconnected or a fuse is blown, the starter will not close. No danger of putting the welder on a single-phase line.

Running—When the windings of the motor reach maximum safe operating temperature *from any cause* ... too frequent overloads, high room temperature plus overload, single-phase running at normal or heavy load, abnormally high or low voltage, phase unbalance or impaired ventilation ... the welder automatically disconnects itself from the source of power!

So now, you can safeguard your welder investment by having a welder that will not burn out!

Learn *all* of the money-saving facts about the New "*Shield-Arc SAE*"! A total of 32 features are fully described in the book illustrated below. A free copy is yours for the asking. THE LINCOLN ELECTRIC COMPANY, Dept. X-334, Cleveland, O.

free — This book, profusely illustrated, gives complete details about *The Complete Welder* ... its operating features and its construction. The coupon will bring you a copy.

THE LINCOLN ELECTRIC CO.,
Dept. X-334, Cleveland, Ohio

Please send a free copy of "The New Arc Welding Technique" to—

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"SHIELD-ARC SAE"

—the New Lincoln Welder with

DUAL Continuous CONTROL

and Self-Protecting Motor

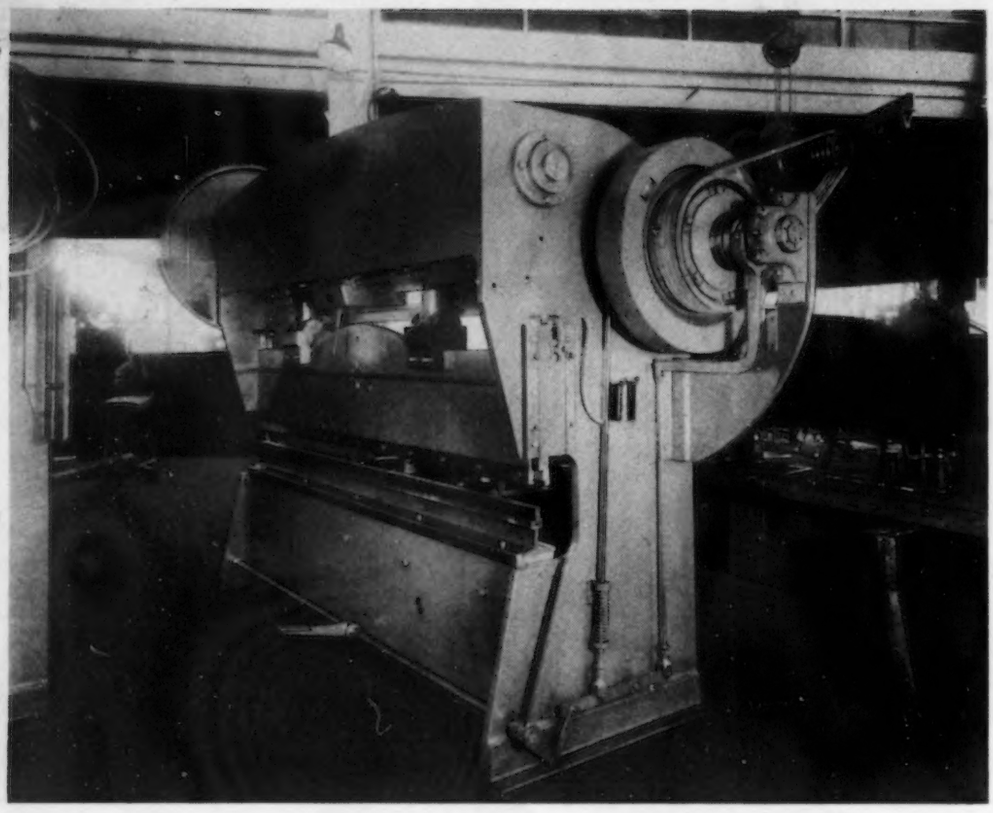


FIG. 32. Dodge Diamond D friction clutch incorporated in flywheel of heavy forming brake.

(CONTINUED FROM PAGE 104)

clutches in general was presented by William Staniar in THE IRON AGE of June 21, 1934. To this may be added the illustration in Fig. 31, which shows eight Stearns magnetic clutches recently installed on the screw-downs of the rolls in a prominent strip steel rolling mill. These clutches provide a safety factor of the utmost importance in roll operation.

There is a very important distinction to be held in mind between the action of the mechanical and the magnetic clutch. Wear on the linings increases the torque on the magnetic clutch, but decreases the torque on the mechanical friction clutch. Magnetic force increases as the air gap decreases; thus a greater pressure is brought to bear on the linings as the armature moves closer to the magnet, resulting in higher torque. Lining wear, plus the wear on toggles, pins, yokes, shifters, etc., in mechanical clutches make frequent adjustments necessary to maintain normal torque ratings. The life and usefulness of the magnetic clutch are therefore greater.

One of the best known of the mechanical friction type clutches, the Dodge Mfg. Corp.'s "Diamond D," has recently been further improved, and is meeting many industrial demands very successfully. A typical heavy installation is shown in Fig. 32, which shows one of these units incorporated in a flywheel mounted on a large steel-forming press. This illustration shows also a Dodge-Timken pillow block supporting the end of the press shaft, and a Dodge V-belt drive applying power to the press from a bracket-supported motor. Interesting applications of the Diamond D friction clutch have been made in an oil field central-geared pumping power unit, on the driving shaft of a draw works in the oil fields, in a cut-off coupling used as a power take-off on a 265 h.p. diesel engine driving a centrifugal dredge pump, and, with a steel split pulley mounted on the clutch sleeve, driving a roll in a metal working plant where the conditions of operation require the clutch to be engaged and disengaged several times during each rolling operation.

Bearings

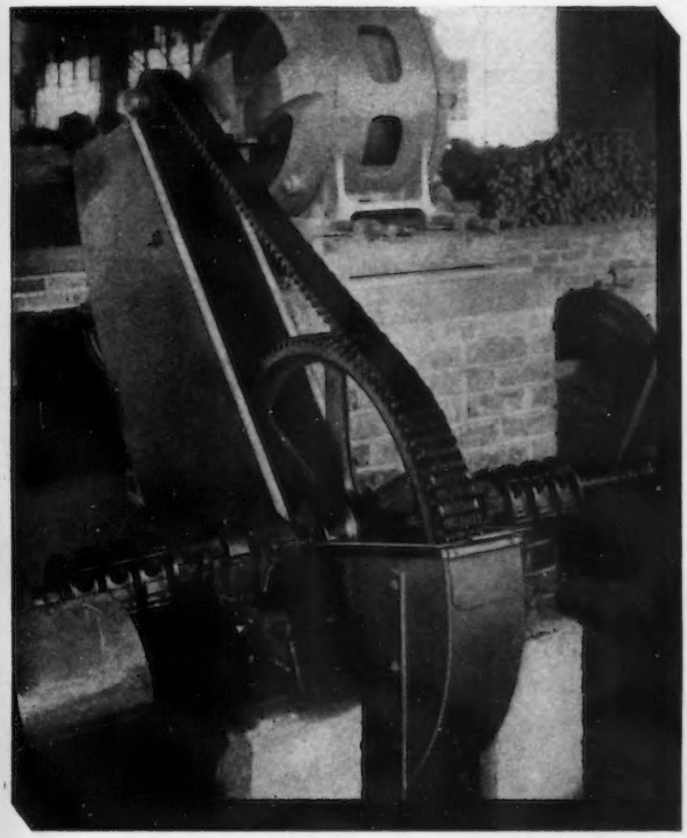
One of the principal recent developments in transmission bearings is the product of Norma-Hoffmann Bearings Corp. It is known as the "cartridge type" bearing. This is a precision ball bearing departing radically from orthodox bearing design, and provides features which heretofore could be incorporated in high speed motors and machines only by elaborate, costly and sometimes complex external means. It is a completely sealed, all metal, single row ball bearing with rings or races of double row width. This extra width gives practically double the grease capacity of any other self-sealed bearing, permits the use of a grease refilling plug, and safeguards against "cocking," slippage and "peening" by the extra wide contact on the shaft and in the housing. Cartridge type ball bearings are especially desirable for motors operating in vertical or tilted positions, or under heavy thrust loads. A Wagner Electric Corp. direct current motor is now equipped with cartridge type bearings.

An interesting line of spherical roller bearings is a new addition of the S.K.F. Industries, Inc. Their split block construction facilitates ease of installation and inspection. The unit has the inherent ability of rolling self-alinement, and there is no possibility of imposing extraneous loads due to inaccuracies

(CONTINUED ON PAGE 114)

No slip-No wasted power

If you try to turn a smooth-faced—or even a grooved—pulley-wheel with your hand, you cannot get a good purchase. If there is a heavy load on the shaft, you can't turn it at all. But you can turn a *toothed* sprocket easily, even though it carries a heavy load. That is the principle of Morse Chain Drives. Teeth, not Tension turn chain drive shafts.



BECAUSE they depend on teeth, not tension, Morse Positive Drives will help you get the most out of your power plant, step up the life of your equipment, and hold your production costs down to profitable levels. Morse Drives cannot slip and waste power.

Morse Silent Chains save space—for they operate on short centers. They save maintenance, for they retain their lubricants so efficiently. Morse Chains run quietly, turning over big loads with a hum instead of a growl. Morse Drives will roll on—year after year—calling for practically no maintenance other than a routine diet of oil. Yet with all their advantages, Morse Chains cost no more than ordinary drives.

Let us show you specifically how Morse Positive Chain Drives will help you. Telephone the Morse man in your territory, or write to us here in Ithaca, today.

Write to Morse, or ask your dealer for this new Stock Book. It's packed with facts about Power Transmission Drives and lists the Morse Silent and Roller Chains and Flexible Couplings, stocked for immediate delivery.

Positive CHAIN DRIVES

ITHACA N.Y. DIVISION OF BORG WARNER CORP.

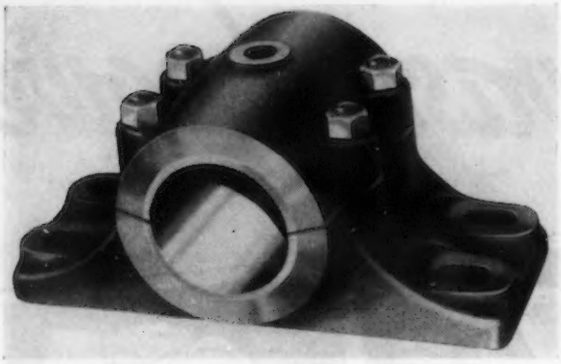


FIG. 33. New Link-Belt streamlined babbitted bearing.

(CONTINUED FROM PAGE 106)

in set-up or deflections of the shaft. The full capacity of the unit is always available for useful work.

Two new Link-Belt Co. bearing units should be mentioned here. In Fig. 35 is shown a streamlined babbitted bearing of wide application. Link-Belt Shafer self-alining roller bearings known as "Series 400" are also new. Shafer self-alining double-row roller bearings are used in Link-Belt mountings for pillow blocks, flange-bearings, hangers and take-ups. Self-alinement is provided in these bearings by concave rollers between convex outer races and a spherical inner race on the sleeve, which is free to deflect with a shaft temporarily misalined or out of line because of inaccuracies of installation. The rollers travel always in a true path on accurate races. Labyrinth seals protect the bearings. Bores are ground for direct shaft application. It is claimed that these bearings will carry radial loads, thrust loads, or radial and thrust loads combined, without damage.

Chain

Baldwin-Duckworth Chain Corp. has developed a 3/16 in. pitch silent chain which is claimed to be the smallest machine-finished, precision power transmission chain now made. It is extremely flexible, light weight and inexpensive, silent in operation and capable of transmitting positive speed ratios. Its principal uses have been in coupling the sound device to film sound projectors, operating the shutter of the electric eye on automatic packaging and materials handling machines, and in correlating delicate timing mechanisms. Fig. 34 illustrates its use on a package wrapping machine in connection with the revolving shutter of the electric photo cell control device. Precision tolerances are adhered to in manufacturing this chain. The heat-treated links insure freedom from breakage, and the case-hardened pins promote long life.

Belting

The new Goodyear flat rubber belt known as "5-R" is described as a square-edge fabric belt with a permanent minimum ratio of tension of 5. This is a transmission belt designed for slack-tension operation, made possible by a newly perfected Goodyear process of impregnating the fabric with a non-resinous rubber compound which gives a coefficient of friction higher than is found in any other type of material. As the belt surface wears, new friction is exposed continually, with all the grip of the original surface. As a result of months of service tests in many kinds of operations, Goodyear claims for this new 5-R belt, lower tension operation, resulting in longer belt life, and reduced bearing pressures, resulting in longer bearing life, with less frictional losses and lower lubrication costs.

TO BE CONCLUDED

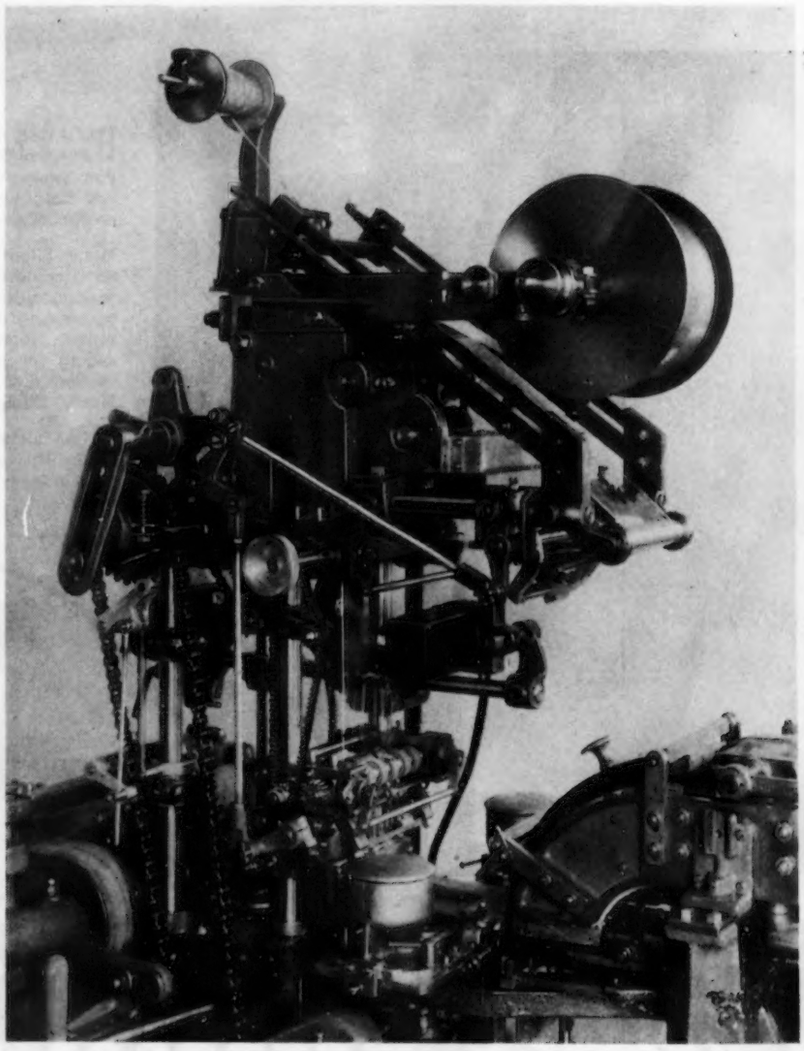


FIG. 34. Baldwin-Duckworth chain as used on timing device of a package wrapping machine.